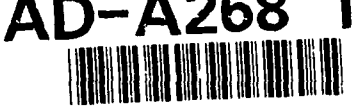



# GROUND WAVE EMERGENCY NETWORK
# FINAL OPERATIONAL CAPABILITY

# ENVIRONMENTAL ASSESSMENT
# FOR
# NORTHEASTERN NEVADA RELAY NODE
## SITE NO. RN 8W922NV

16 April 1993





Electronic Systems Center
Air Force Material Command, USAF
Hanscom AFB, Massachusetts 01731-1623

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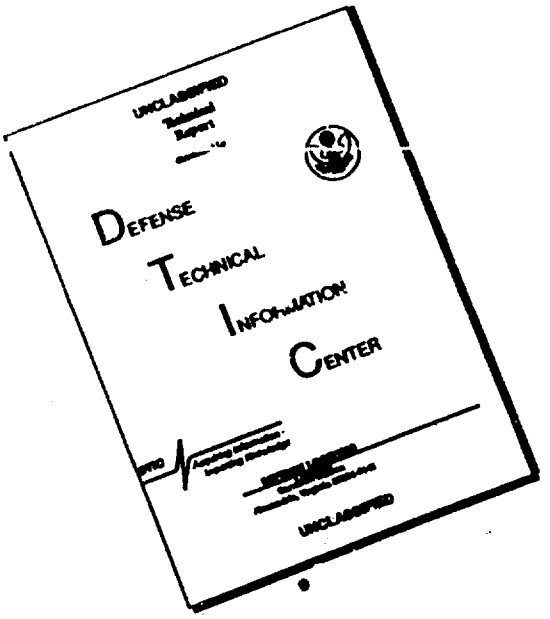


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THE GROUND WAVE EMERGENCY NETWORK (GWEN) IS a RADIO COMMUNICATION SYSTEM designed to Relay emergency messages Between Strategic military areas in the Continental United states.

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PREFERRED GWEN SITE REPORT
NORTHEASTERN NEVADA

The U.S. Air Force is proposing to construct a relay node for the Ground Wave Emergency Network (GWEN) in northeastern Nevada. The Air Force has followed the siting process described in Section 5 of the Final Environmental Impact Statement (FEIS) for the Final Operational Capability (FOC) phase of the GWEN program to identify alternative Candidate GWEN Sites (CGSs). The six CGSs identified in northeastern Nevada are referred to as the Van Norman, Bureau of Land Management (BLM)-1, BLM-2, Wright, Packer, and BLM-3 sites. Subsequent to the field investigation and site-specific studies, Mr Packer withdrew his property from further consideration by the Government. However, the Air Force has made the decision to evaluate and publish the data already gathered on that site as well as the other five sites.

This report summarizes the process of selecting the preferred site from the six CGSs. This PGSR, along with a site-specific Environmental Assessment (EA) and Finding of No Significant Impact (FONSI), is being distributed for information and comment in compliance with the Air Force's process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP).

Operational, environmental, and developmental suitability; construction and real estate acquisition costs; and public comments and concerns are all factors which have been considered in arriving at the selection of the preferred site.

Without an **operationally suitable** location, connectivity of the relay node in northeastern Nevada to the GWEN network cannot be achieved. Ground conductivity measurements are acceptable at all six CGSs. During the site-specific studies, no radio frequency interference was detected in the GWEN frequency bands which would interfere with the operation of the GWEN receiver. However, CGSs 1 and 6 are slightly more acceptable than the other four. Operations at any of the sites would pose no interference with other known systems. Therefore, all six CGSs are operationally suitable.

The next major factor considered in the selection of the preferred site was **environmental suitability**. The environmental suitability of each CGS was determined from information provided by an independent field analysis and is documented in the EA. The EA for the six CGSs was completed in April 1993. The environmental analysis found that construction of a GWEN relay node at the BLM-1 and BLM-2 sites would have significant visual impact. A FONSI for the remaining four sites was completed on 4 May 1993. Thus, four CGSs are environmentally suitable, but none of these four are environmentally favored over the others.

All six CGSs are **suitable for development** as a GWEN relay node. The FAA has approved construction of the GWEN relay node at any of the six CGSs. **Construction cost** is also a consideration in the selection of the preferred site. Construction costs for the Wright site are high. Construction costs at the other five sites are acceptable and are not significantly different. Therefore, developmental suitability and construction cost are not major discriminators between the last five sites.

**Real estate** negotiations have been completed for the lease of the Van Norman and Wright sites. The three BLM sites require a no cost right-of-way release. Of these three, the Elko County Commissioners prefer the BLM-3 site and will not endorse the other five sites as being suitable. The Packer site was withdrawn before

negotiations. All sites are acceptable to the Air Force, however, since the BLM sites are no cost they are more favorable.

With operational, environmental, and developmental factors evaluated and acquisition and construction costs considered, the Air Force prefers the BLM-3 site. The BLM-3 site is preferred because it is operationally, environmentally, and developmentally suitable and is the least expensive site to develop.

I have therefore selected the BLM-3 site as the Air Force's preferred site for development as the GWEN relay node in northeastern Nevada. After reviewing the information received during the IICEP process, I will direct the final land acquisition activities and construction of the GWEN relay node.

STEPHEN T. MARTIN, LT COL, USAF
Program Manager, GWEN

5 May 93
(Date)

# FINDING OF NO SIGNIFICANT IMPACT

**NAME OF ACTION:** GROUND WAVE EMERGENCY NETWORK
NORTHEASTERN NEVADA RELAY NODE

**DESCRIPTION OF PROPOSED ACTION ALTERNATIVES:**

The U.S. Air Force plans to construct a radio communications relay node in northeastern Nevada (Elko County) as part of the Ground Wave Emergency Network (GWEN) communications system. Six action alternatives associated with six candidate GWEN sites (CGSs) in northeastern Nevada and the no action alternative have been considered and evaluated in an environmental assessment (EA).

GWEN is a radio communications system designed to relay emergency messages between strategic military areas in the continental United States. The system is immune to the effects of high-altitude electromagnetic pulse (HEMP) energy surges caused by nuclear detonations in the ionosphere that would disrupt conventional communications equipment. A failure of such equipment would prevent timely communications among top military and civilian leaders and strategic Air Force locations and prevent U.S. assessment and retaliation during an attack. GWEN is an essential part of a defense modernization program to upgrade and improve our nation's communications system, thereby strengthening deterrence.

The GWEN system is a network of relay nodes, receive-only stations, and input/output stations. The relay node in northeastern Nevada would be part of the Final Operational Capability (FOC) phase of the GWEN system and would establish essential links with adjacent nodes in the network.

In September 1987, the U.S. Air Force Electronic Systems Division, Hanscom Air Force Base, Massachusetts published a Final Environmental Impact Statement (FEIS) for the GWEN FOC that addressed the system as a whole and identified expected environmental effects common to all sites. Section 5 of the FEIS described a siting process that is designed to minimize the potential for environmental impacts. This process has three distinct phases: network definition, regional screening, and individual site evaluation. Network definition identified the need for a relay node in northeastern Nevada. Regional screening resulted in the identification of six CGSs in northeastern Nevada that met the exclusionary and evaluative criteria described in that FEIS. Individual site evaluation examined the relative suitability of the CGSs through site-specific technical studies. The EA is a part of the third phase and is tiered from that FEIS. It addresses the potential environmental effects of the six action alternatives and the no action alternative.

The proposed relay node in northeastern Nevada will be an unmanned facility located on approximately 11 acres of land and, once constructed, will resemble an AM radio broadcast station. The facility will consist of a 299-foot-tall, low-frequency (LF) transmitter tower, three equipment shelters, an access road, and associated fences. The tower will be supported by 24 guy wires, including 12 top-loading elements. An equipment shelter at the tower base will contain an antenna tuning unit. An 8-foot-high chain link fence topped with barbed wire will surround the tower base and associated equipment shelter. A radial ground plane, composed of 100, 0.128-inch-diameter copper wires buried about 12 inches underground, will extend out about 330 feet from the tower base. A 4-foot-high fence will be installed around the perimeter of the copper radials.

A second equipment area located at the site perimeter will contain two shelters housing a back-up power group (BUPG) with two internal fuel storage tanks and radio processing equipment. The BUPG will operate during power outages and for testing purposes. An LF receive antenna, consisting of a pair of 4-foot-diameter rings mounted on a 10-foot pole, and an ultrahigh-frequency (UHF) antenna, used for communicating with airborne input/output terminals and consisting of a 9-foot-high whip-like antenna mounted on a 30-foot-high pole, will also be located in this area. An 8-foot-high chain link fence topped with barbed wire will enclose the entire equipment area. A 10-foot-wide gravel road will connect this area to the tower base. A 12-foot-wide gravel road will provide access to the site from a public road.

The station will use existing commercial three-phase electric power and telephone service. Power and telephone service will be brought to the site through either overhead or buried lines, depending on local utility practices. In its ready status, the antenna will transmit in the LF radio band at 150 to 175 kilohertz for a total of 6 to 8 seconds per hour.

Four action alternatives are discussed in this Finding of No Significant Impact (FONSI). The BLM 1 (CGS-2) and BLM 2 (CGS-3) sites would have significant visual impacts. These two sites will therefore not be considered in this FONSI.

**ANTICIPATED ENVIRONMENTAL EFFECTS**

The EA evaluated potential impacts to the physical, biological, and socio-cultural environment from construction and operation of the relay node.

The project would have no significant impacts on physical resources. Erosion and increased runoff would be minimized by using proper erosion control techniques during construction and by restoring the vegetation to preexisting natural conditions. Impacts to mineral resources would be minor. Paleontological resources are not likely to occur on any of the sites; therefore significant impacts to them are not anticipated. No prime farmland would be removed from production. Water quality would not be significantly affected because increases in copper concentrations due to corrosion of the ground plane would be negligible. Air quality would not be significantly affected. During construction, temporary and insignificant increases in emissions would occur, and during operation, emissions from the BUPG would not be sufficient to result in violation of air quality standards.

The project would have no significant impacts on biological resources. The sites are located on grazing land and do not contain sensitive wildlife habitat. None of the sites contains wetlands and none is within a 100-year floodplain. Informal consultation with the U.S. Fish and Wildlife Service indicated that the project would not affect any threatened or endangered species. The Nevada Department of Wildlife indicated that no state-listed threatened or endangered species are known to occur on any of the sites. Bird-tower collisions may occur but would not be significant because the tower would be located away from primary bird habitats and migratory routes.

The project would have no significant impacts on socio-cultural resources. Construction would have a small, beneficial impact on the local economy, in part by providing temporary employment for contractors and construction workers. Community support systems would not be significantly affected. Land use and noise impacts would not be significant. The relay node signal would not interfere with commercial television or radio broadcasts, amateur radio operations, garage door openers, or pacemakers. Radio-frequency emissions outside the fenced area around the tower base would not pose a health hazard to humans or animals. The Nevada Department of Conservation and Natural Resources, Division of Historic Preservation and Archeology, was consulted and concurred that the project would not affect significant cultural resources. Significant impacts to Native American traditional, religious or sacred sites are not anticipated. A visual analysis conducted in accordance with the criteria developed in the FOC FEIS concluded that the relay node facility would not cause significant visual impacts.

**CONCLUSIONS:**

No significant impacts to the surrounding environment would be caused by construction and operation of the proposed relay node on the Van Norman (CGS-1), Wright (CGS-4), Packer (CGS-5), or BLM 3 (CGS-6) site. Therefore, an environmental impact statement for a GWEN relay node at the cited locations in northeastern Nevada is not required.

Robert A. Zongol
Chairman
HQ ESC Environmental Protection Committee

9 May 93
Date

GROUND WAVE EMERGENCY NETWORK
FINAL OPERATIONAL CAPABILITY

# ENVIRONMENTAL ASSESSMENT
# FOR
# NORTHEASTERN NEVADA RELAY NODE
## SITE NO. RN 8W922NV

16 April 1993




Electronic Systems Center
Air Force Material Command, USAF
Hanscom AFB, Massachusetts 01731-1623

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## SUMMARY

The Ground Wave Emergency Network (GWEN) is a radio communication system designed to relay emergency messages between strategic military areas in the continental United States. The system is immune to the effects of high-altitude electromagnetic pulse (HEMP) energy surges caused by nuclear bursts in the ionosphere that would disrupt conventional communications equipment such as telephones and shortwave radios. A failure of such equipment would prevent timely communications among top military and civilian leaders and strategic Air Force locations and prevent U.S. assessment and retaliation during an attack. GWEN is an essential part of a defense modernization program to upgrade and improve our nation's communications system, thereby strengthening deterrence.

The GWEN system consists of a network of relay nodes, receive-only stations, and input/output stations. Each relay node, such as the one proposed in northeastern Nevada, consists of a guyed radio tower facility similar to those used by commercial AM broadcast transmitters.

A Final Environmental Impact Statement (FEIS) for the GWEN Final Operational Capability (FOC) was published in September 1987 by the Electronic Systems Division, Hanscom Air Force Base, Massachusetts. That FEIS addressed the GWEN system as a whole, identifying expected environmental effects common to all sites. Section 5, beginning on page 5-1 of the FEIS, described a siting process that is designed to minimize the potential for environmental impacts. This process has three distinct phases: network definition, regional screening, and individual site evaluation.

Phase 1, network definition, identified the geographic coordinates that met the operational needs and technical constraints of the network. Each set of coordinates became the center of a circular site search area (SSA) with a 9-mile radius (250 square miles). The SSA discussed in this Environmental Assessment (EA) was centered 1.7 miles north of the town of Tuscarora in Elko County, northeastern Nevada, at latitude 41.34° N and longitude 116.22° W. The principal town in the SSA is Tuscarora.

Phase 2, regional screening, involved the application of exclusionary and evaluative criteria to the SSA to avoid environmentally sensitive areas. The remaining areas, called potential areawide sites (PAWS), became the focus of the siting process. The field investigation for northeastern Nevada was conducted in February 1990. Six sites were identified during automobile-based surveys as potential candidate GWEN sites (PCGSs), and attempts were made to contact the owners of the sites to determine their interest in selling or leasing land to the Government. Rights-of-entry were granted to investigate three PCGSs. Three PCGSs were Bureau of Land Management (BLM) land and did not require rights-of-entry. Following evaluation against the environmental criteria set forth in the FEIS, all six PCGSs were recommended as candidate GWEN sites (CGSs) for further review. These CGSs were described in the Preliminary Site Evaluation Report (PSER) of April 27, 1990.

Subsequent to the PSER being issued, one CGS landowner withdrew one site from consideration (Packer, CGS-5). The landowner is no longer interested in leasing or selling land to the Air Force. However, since the site-specific studies had been accomplished on the site prior to the owner's withdrawal and because the site continues to be considered as a viable alternative, the Air Force has presented this data on the withdrawn site in this EA.

Phase 3, individual site evaluation, involves evaluating the relative suitability of the candidate sites through site-specific technical studies. This EA is a product of those evaluations and discusses the six siting alternatives in northeastern Nevada. It addresses only those criteria that apply to the candidate sites. The seventh alternative, no action, would impair performance of the GWEN system but leave the environment unchanged.

To be suitable for construction and operation, a site should measure at least 700 by 700 feet (approximately 11 acres), be relatively level and undeveloped, be free of natural or man-made obstructions, and have soils capable of supporting relay node structures. The site should also be close to all-weather roads, commercial three-phase power, and telephone lines to minimize costs. To operate effectively, the site must be located at least

a minimum distance from obstructions that could affect reception and transmission. These include buildings and towers, high-voltage power lines, and other communications systems or sources of radio-frequency interference. Specific minimum distances depend on height and power levels of identified obstructions or interfering sources.

This EA shows that construction and operation of a GWEN relay node on the BLM 1 (CGS-2) or BLM 2 (CGS-3) site would have significant visual impacts, as discussed in Sections 4.3 and 4.4 of this EA.

The project would have no significant impacts if constructed on the Van Norman (CGS-1), Wright (CGS-4), Packer (CGS-5), or BLM 3 (CGS-6) site. During the 6-week construction period, the project would cause temporary and insignificant air quality and noise impacts and slight increases in traffic. It would have a small, beneficial impact on the local economy, in part because it would provide temporary employment for contractors and construction workers. If constructed on any of the sites, the project would have no significant impacts on air quality; water quality; land use; biological resources, including threatened and endangered species; mineral resources; known paleontological resources; or cultural resources that are listed, eligible, or potentially eligible for listing on the National Register of Historic Places. Visual impacts would not be significant. Radio-frequency emissions outside the fenced area around the tower base would not pose a health hazard to humans or animals.

## 1.0 PURPOSE AND NEED FOR ACTION

The proposed action covered by this Environmental Assessment (EA) includes construction and operation of a relay node of the Ground Wave Emergency Network (GWEN) in northeastern Nevada (see Figure 1.1 of this EA). This relay node will provide essential connections with adjacent nodes in the network. The major features of a GWEN relay node and associated environmental impacts common to all sites are addressed in the Final Environmental Impact Statement (FEIS) for the Final Operational Capability (FOC) phase of GWEN, which was published in September 1987 by the Electronic Systems Division, Hanscom Air Force Base, Massachusetts. This EA is tiered from that FEIS and addresses site-specific conditions at the candidate GWEN sites (CGSs) for this particular site search area (SSA).

The purpose of GWEN is to provide to the President and the National Command Authority a strategic communications network that is immune to the effects of high-altitude electromagnetic pulse (HEMP) and will carry critical attack warning and force execution data. As a result, GWEN will remove any possibility of potential aggressors taking advantage of the electromagnetic pulse generated by a high-altitude nuclear burst. A HEMP surge would disrupt the nation's electric power line transmission capability, cripple electronic devices, and adversely affect skywave communications networks based on conventional electronics. GWEN provides a low-frequency (LF) ground wave communication network that will not be affected by HEMP effects. It thereby strengthens deterrence by removing the option of beginning an attack against the United States by using HEMP effects.

A partial GWEN network, called the Thin Line Connectivity Capability (TLCC), has been completed. It contains 8 input/output stations, 30 receive-only stations, and 54 relay nodes. The TLCC provides a limited level of HEMP-protected communications to strategic forces and the National Command Authority.

The FOC phase of GWEN will add 29 relay nodes. The FOC will allow communication along several routes, thereby enhancing system availability and ensuring that vital communications will be maintained.

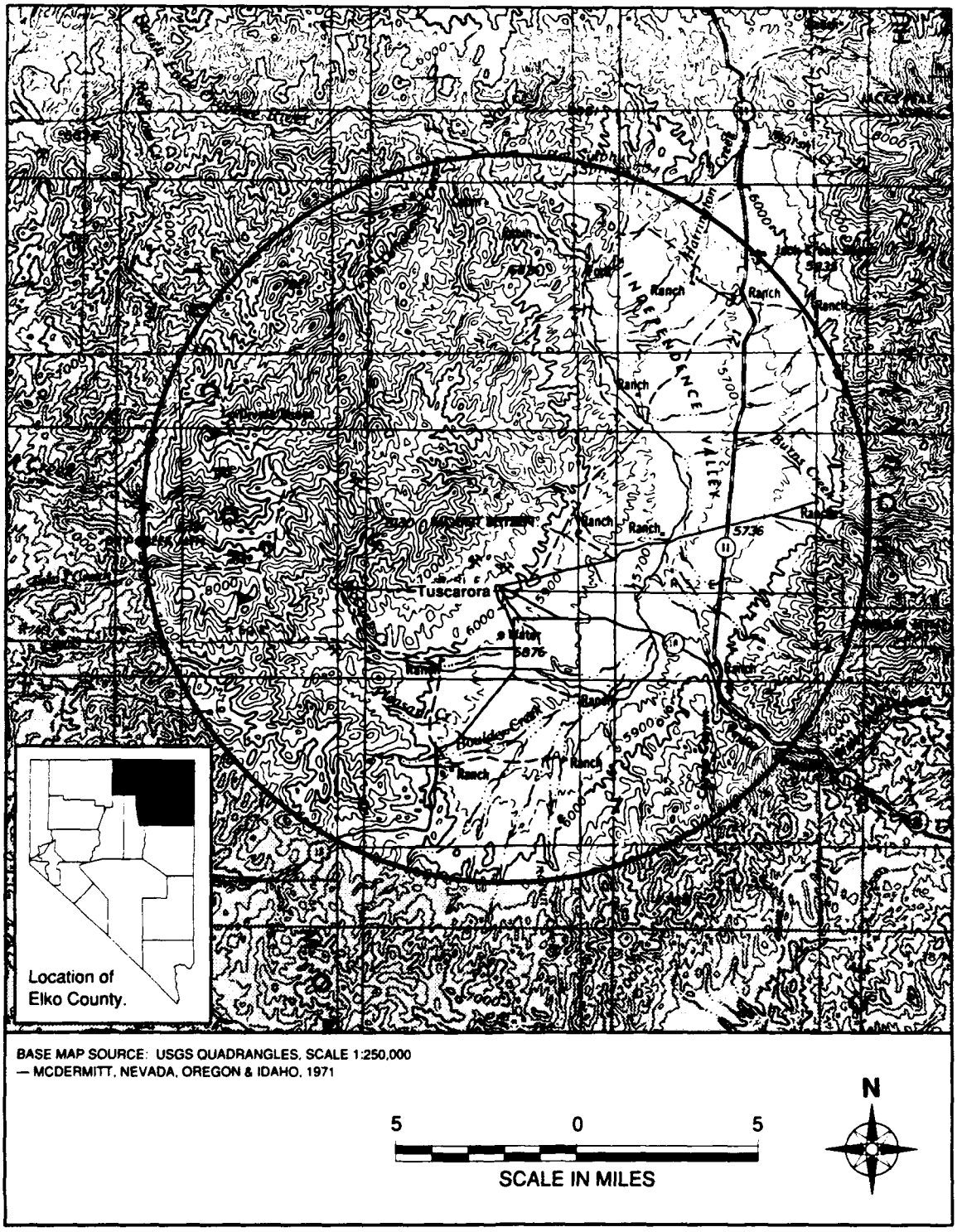


FIGURE 1.1 NORTHEASTERN NEVADA SITE SEARCH AREA (SSA), ELKO COUNTY, NEVADA

# 2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The six action alternatives are site-specific applications of the standard relay node design presented in the FEIS. Consequently, they share a number of features that are discussed in Section 2.1 of this EA. The site-specific features are discussed in Sections 2.2 through 2.7 of this EA. Site descriptive data was obtained during field investigations conducted in February 1990. Figure 2.1 of this EA shows the six CGSs in relation to the major features of the SSA. Figure 2.2 and Appendix B of this EA show the locations of the CGSs in relation to roads and surrounding topography, respectively.

## 2.1 Common Features of the Action Alternatives

### 2.1.1 Site Selection Process

The process used to select sites is described in Section 5, beginning on page 5-1 of the FEIS. This process has three distinct phases: network definition, regional screening, and individual site evaluation. Appendix A of this EA provides a diagram of the site selection process. The environmental criteria used in this process are defined in Tables 5-1 and 5-2, pages 5-7 through 5-14 of the FEIS.

Phase 1, network definition, involved locating network nodes to optimize their performance while serving a predetermined number of users. A typical GWEN ground wave has an effective range of about 150 to 200 miles. Thus, relay nodes could not be located independently; changing the location of one would affect the connectivity with other nodes in the network. Once the optimal coordinates of the relay nodes were identified, a 9-mile-radius SSA was defined around each point to provide suitable opportunity for siting a relay node near that point. The 9-mile radius was chosen because it provided a reasonably sized search area consistent with the technical constraints of the relay node. If a significant portion of an SSA fell within an environmentally highly sensitive area such as a national park or wilderness area, an alternative was selected and its connectivity evaluated. This process was repeated until all relay nodes fell outside such areas.

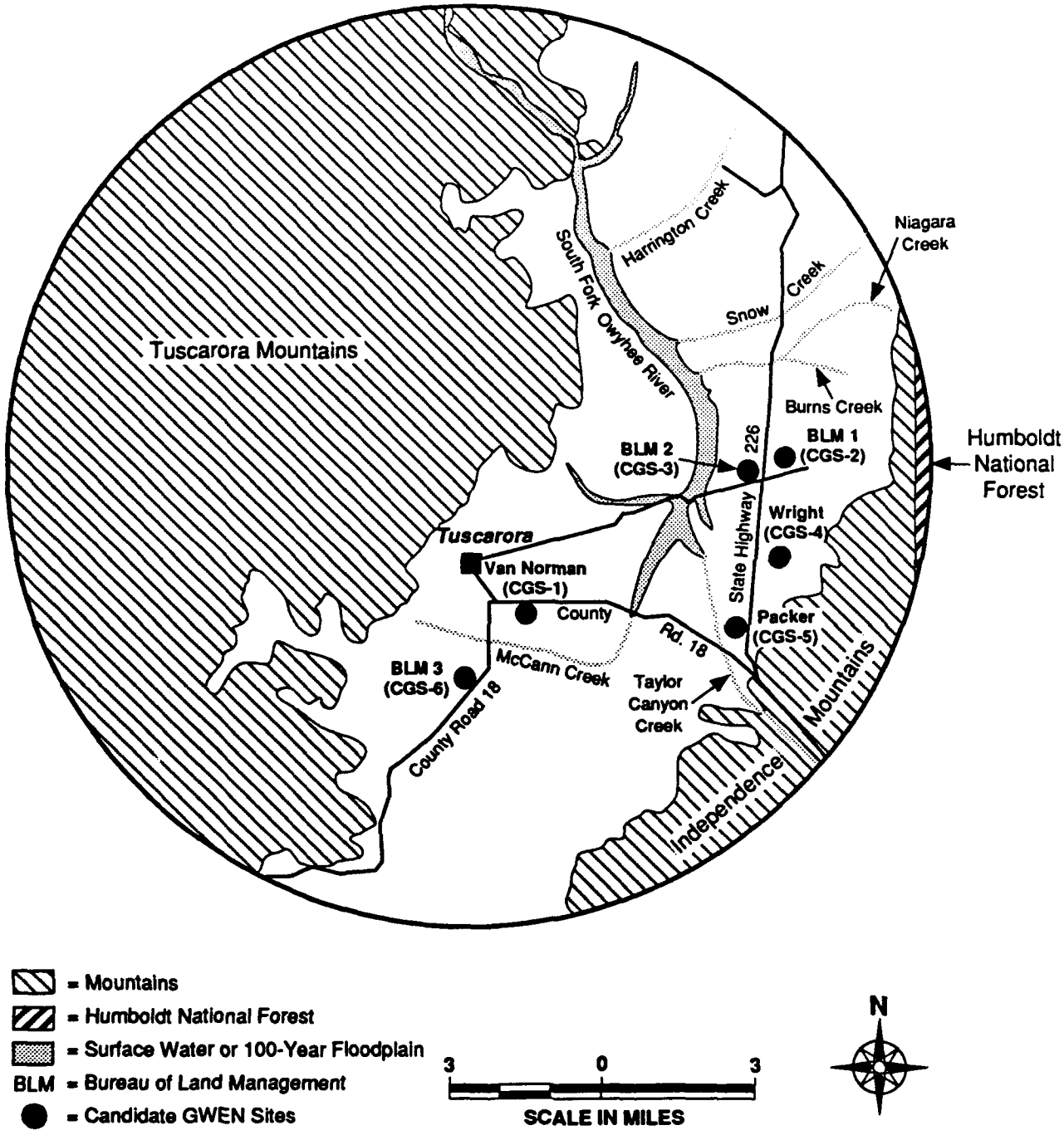


FIGURE 2.1 LOCATIONS OF CANDIDATE GWEN SITES (CGSs) RELATIVE TO SELECTED MAJOR FEATURES AND ROADS WITHIN THE NORTHEASTERN NEVADA SITE SEARCH AREA

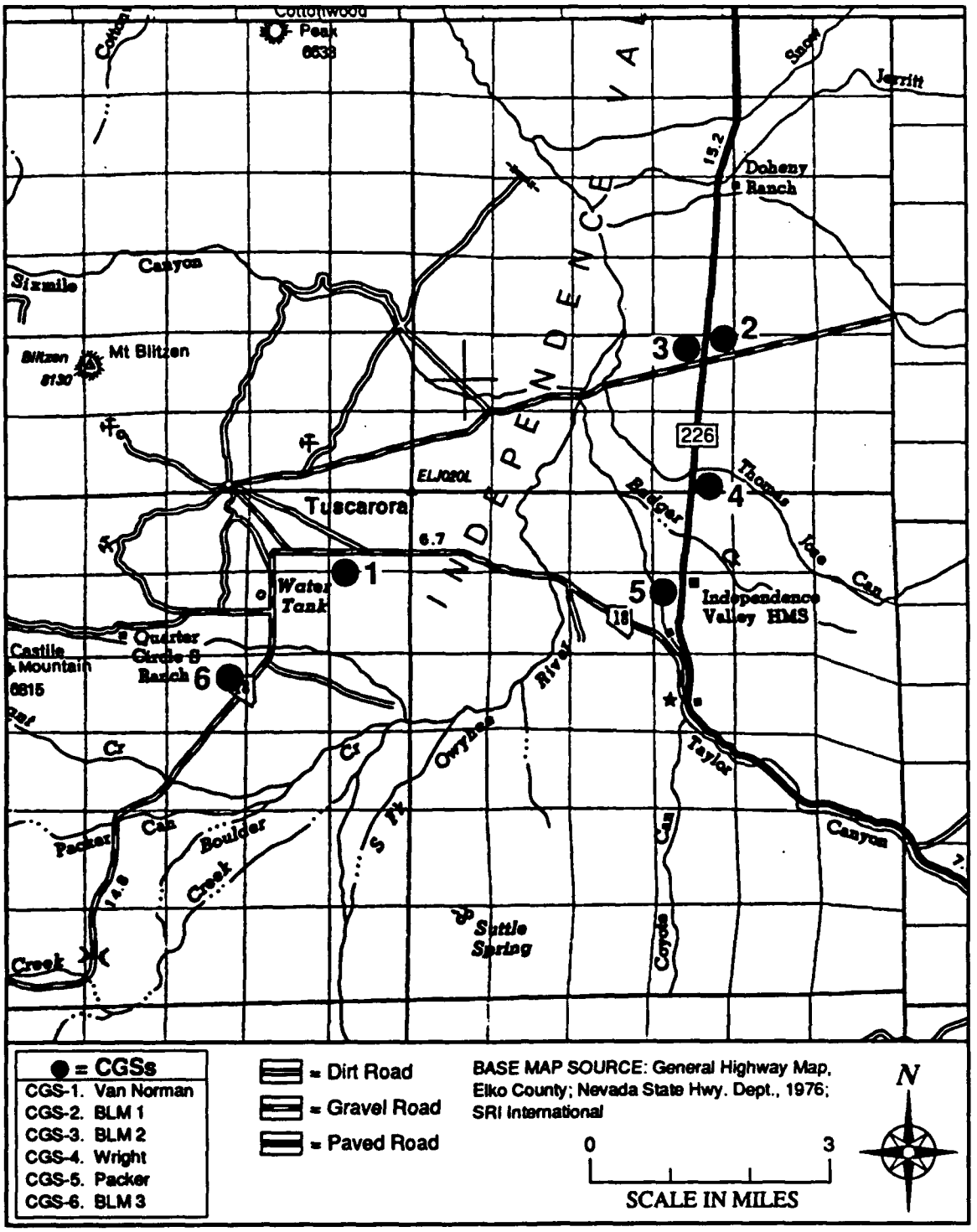


FIGURE 2.2 LOCATIONS OF CANDIDATE GWEN SITES (CGSs) IN ELKO COUNTY

Phase 2, regional screening, involved the application of exclusionary and evaluative criteria to the SSA to identify areas that might contain operationally acceptable sites outside environmentally sensitive areas. The resulting search areas, called potential areawide sites (PAWS), were submitted to appropriate federal, state, and local officials for review. The PAWS were then redefined, as appropriate, by incorporation of the comments of the reviewers, and a field investigation was conducted to find suitable candidate sites for a GWEN relay node within the redefined PAWS.

The field investigation for northeastern Nevada was conducted in February 1990. Six sites were identified during automobile-based surveys as potential candidate GWEN sites (PCGSs), and attempts were made to contact the owners of the sites to determine their interest in selling or leasing land to the Government. Rights-of-entry were granted to investigate three PCGSs. Three PCGSs were Bureau of Land Management (BLM) land and did not require rights-of-entry. Following evaluation against the environmental siting criteria set forth in the FEIS, all six of the PCGSs were recommended as CGSs for further review.

Subsequent to the PSER being issued, one CGS landowner withdrew one site from consideration (Packer, CGS-5). The landowner is no longer interested in leasing or selling land to the Air Force. However, since the site-specific studies had been accomplished on the site prior to the owner's withdrawal and because the site continues to be considered as a viable alternative, the Air Force has presented this data on the withdrawn site in this EA.

Phase 3, individual site evaluation, of which this EA is a part, is then used to determine the relative suitability of the candidate sites through site-specific technical studies. This EA presents the results of the environmental portions of those studies and covers site-specific impacts associated with construction of a relay node in northeastern Nevada. These are summarized in Sections 4.2 through 4.7 of this EA. The findings of this EA and site-specific studies of operational parameters will be used to select a preferred GWEN site (PGS).

### 2.1.2 Relay Node Construction and Operation

A typical relay node site is located on approximately 11 acres of land (see Figure 2.3 of this EA). It is an unmanned facility consisting of a 299-foot-tall, three-sided, 2-foot-wide LF transmitter tower, three equipment shelters, an access road, and associated fences. The tower has a base insulator and lightning protection and is supported by 24 guy wires, including 12 top-loading elements to further strengthen the signal and provide additional structural support.

These guy wires and top-loading elements are attached to the tower and to 18 buried concrete anchors. The sizes of these anchors and their depth of burial varies with local soil and bedrock properties. However, the guy-wire anchors typically are rectangular blocks buried 5 feet below the surface. If bedrock occurs at or near the surface, the anchors are special rock-embedded rods. The tower base is concrete with a cross-section area resembling an inverted T. The size of this foundation is determined by soil conditions.

A radial ground plane, composed of 100 buried copper wires, extends out from the base of the tower. Each wire is 0.128 inch in diameter, about 330 feet long, and buried approximately 12 inches underground. The ground plane helps to strengthen the broadcast signal, and the number and length of the wires depend on the soil conductivity at the site. A 4-foot-high fence is installed around the perimeter of the ground plane to protect the ground plane and guy anchors and to prevent inadvertent exposure to electric shock resulting from the buildup of static electric charge.

In addition to the main tower, the relay node has two other antennas. One is an LF receive antenna made up of a pair of 4-foot-diameter rings mounted on a 10-foot pole. The second is an ultrahigh-frequency (UHF) antenna used for communicating with airborne input/output terminals. It is a 9-foot-high whip-like antenna mounted on a 30-foot-high pole. Both antennas are located within the equipment area at the perimeter of the site, which is enclosed by an 8-foot-high fence.

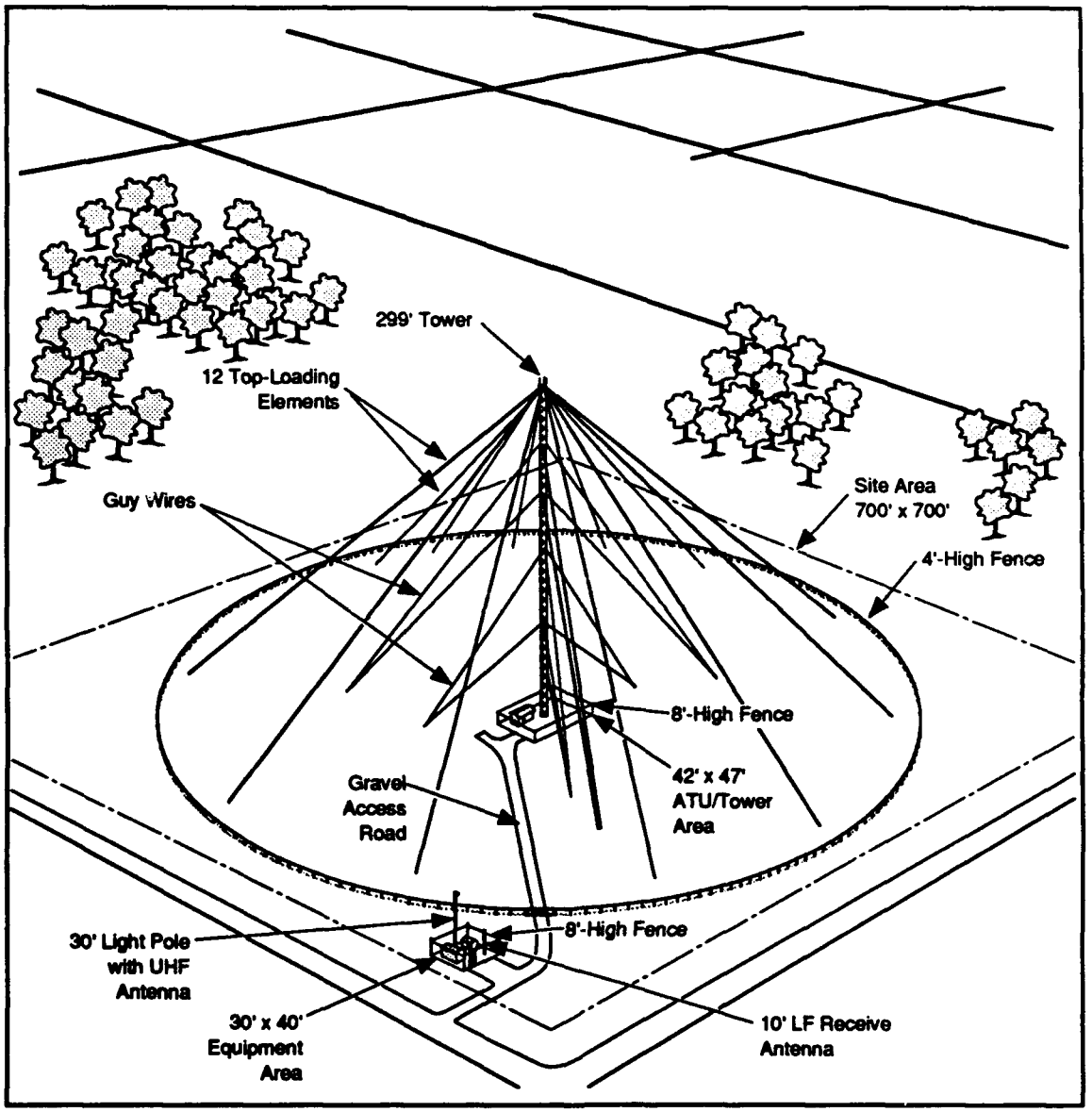


FIGURE 2.3 TYPICAL LAYOUT OF FOC RELAY NODE STATION

The siting and design of the tower are coordinated with the Federal Aviation Administration (FAA) to ensure compliance with FAA standards and regulations. The tower is equipped with a white strobe light at the top, which emits 40 flashes per minute and is rated at 20,000 candelas for daytime and twilight use and 2,000 candelas for nighttime use. To minimize glare at ground level, the light is focused upward and horizontally outward.

GWEN operates intermittently in the LF radio band at 150 to 175 kilohertz (kHz). For comparison, the low end of the AM band for commercial broadcasts is 530 kHz. The peak broadcast power for each GWEN tower is from 2,000 to 3,000 watts, depending on local soil conditions. In its ready status, GWEN typically transmits between 6 and 8 seconds per hour. GWEN does not interfere with commercial television, radio broadcasts, amateur radio operations, garage door openers, or pacemakers, as noted in Section 2.1.1.1, page 2-3 of the FEIS.

All equipment shelters are anchored to concrete pads. One shelter, located at the base of the tower, houses the antenna tuning unit (ATU). Two other shelters are located side by side in the equipment area enclosed at the perimeter of the property. One houses radio processing equipment, and the other houses a 70-horsepower, back-up diesel generator and two aboveground fuel tanks. The generator operates 2 hours per week for testing purposes and during power outages. Locked, 8-foot-high chain link fences topped with barbed wire secure the equipment shelter areas at the base of the tower and at the perimeter of the site to provide safety and to inhibit unauthorized entry. A 12-foot-wide gravel road provides access to the equipment area enclosure at the perimeter of the property. A 10-foot-wide gravel road leads from the equipment enclosure to the tower.

Fuel is stored in two aboveground steel tanks inside the generator shelter. Tank capacities are 559 gallons and 461 gallons. Each tank pipes fuel separately to the back-up power group (BUPG) and is equipped with two outlet shut-off valves, one controlled manually and one controlled automatically. If a leak occurs, fuel will flow into a floor drain leading to a tightly capped pipe extending outside the BUPG. Once approximately 2 gallons of fuel accumulate in the pipe, a "liquid spill" signal is sent to the GWEN Maintenance Notification Center, which will dispatch maintenance personnel. However, if a leak were not detected, an explosion inside the shelter would be extremely unlikely due

to the high flash point of diesel fuel. If a tank at the GWEN station failed, the entire contents of one tank could be released and contained inside the BUPG shelter. Refer to Section 4.12.1.1, beginning on page 4.12-1 of the FEIS for further discussion on diesel fuel spills and leaks.

The station uses existing commercial three-phase electric power and telephone service, but does not require water, septic, or sewer systems. Power and telephone service are brought to the site through either overhead or buried lines depending on local utility practices. Power and telephone service are generally brought underground from the site boundary to the equipment shelter area.

Temporary increases in air pollutant emissions will occur during construction, primarily from greater use of heavy machinery than is required in normal farming operations. Emissions resulting from operations of the facility will be limited to the operation of the BUPG, which will operate only 2 hours every week for testing purposes and for additional periods as required during power outages. Thus, the generator will operate for a total of 152 hours per year, if commercial power outages totaled 48 hours. If the generator runs at 100 percent load during the projected 152-hour operating time, total emissions in one year will be less than 350 pounds per pollutant, as documented in Section 4.3.1, beginning on page 4.3-1 of the FEIS.

Noise levels generated by construction equipment are discussed in Section 4.5.1.1, beginning on page 4.5-1 of the FEIS. Under worst-case assumptions, levels could reach 78 dBA at the site boundary from on-site activity and 92 dBA at distances of 50 feet from equipment installing the off-site access road. Noise generated during GWEN operation would come from the BUPG, which will operate only 2 hours per week and during commercial power outages. The BUPG will be located at least 50 feet within the site boundary with its exhaust side oriented toward the tower area. Noise levels due to intermittent operation of the BUPG will be less than 72 dBA at the site boundary, which is within the standards typically set for lands under agricultural use (70 to 75 dBA). At 50 feet beyond the site boundary, the noise level would drop below 65 dBA, which is within the standards typically set for residential and mixed residential/agricultural use (55 to 65 dBA).

These noise levels and standards are discussed in Section 3.5.3, page 3.5-2 and Section 4.5.1, pages 4.5-1 through 4.5-6 of the FEIS.

Construction will require as many as 20 workers at any given time and take about 6 weeks. Standard earth-moving and erection equipment will be used, as detailed in Table 2-1, page 2-14 of the FEIS. Erosion control techniques that are consistent with local practices will be used during construction. Vegetation removal and grading at all of the sites will be minimal. The site's vegetation will be restored to its preexisting natural condition.

After construction is completed, personnel requirements will be limited to periodic maintenance by a contractor who will service the equipment, cut the surface growth, remove snow from the access road, and perform other services, as needed. Security services will be arranged with local authorities. The projected life of the facility is 15 to 25 years. Upon decommissioning, the tower and other structures will be removed, as discussed in Section 2.1.4, page 2-18 of the FEIS.

## 2.2 Alternative 1: Van Norman Site (CGS-1)

The Van Norman site is 26 feet south of County Road 18 and approximately 5 miles west of the intersection of State Highway 226 and County Road 18, in the southwest quarter of the southwest quarter (SW1/4 SW1/4) of Section 1, Township 39N, Range 51E, in Elko County. The access road would be from County Road 18 and would be 26 feet long.

Three-phase power would be obtained from overhead lines 122 feet north of the site, across County Road 18. Telephone lines would be connected to an underground cable approximately 70 feet north of the site, across County Road 18.

Appendix B, Figure B.1 of this EA, provides a map showing the surrounding topography.

## 2.3 Alternative 2: BLM 1 Site (CGS-2)

The BLM 1 site is at the northeast corner of the intersection of State Highway 226 and an unnamed gravel road, approximately 450 feet east of State Highway 226 and 30 feet north of the gravel road, in the E1/2 NE1/4 of Section 27, Township 40N, Range 52E, Elko County. The access road would be from the gravel road and would be 30 feet long.

Three-phase power would be obtained from overhead lines 150 feet southwest of the southwest corner of the site, along State Highway 226. Telephone lines would be connected to an underground cable 60 feet south of the site, across the gravel road.

Appendix B, Figure B.2 of this EA, provides a map showing the surrounding topography.

## 2.4 Alternative 3: BLM 2 Site (CGS-3)

The BLM 2 site is across State Highway 226 due west of the BLM 1 site (CGS-2), in the northwest corner of the intersection of State Highway 226 and an unnamed gravel road, 42 feet west of State Highway 226 and 32 feet north of the gravel road, in the W1/2 NE1/4 of Section 27, Township 40N, Range 52E, Elko County. The access road would be from the gravel road and would be 32 feet long.

Three-phase power would be obtained from overhead lines 475 feet east of the southeast corner of the site, across State Highway 226. Telephone lines would be connected to an underground cable 103 feet east of the site, across State Highway 226.

Appendix B, Figure B.3 of the EA, provides a map showing the surrounding topography.

## 2.5 Alternative 4: Wright Site (CGS-4)

The Wright site is 440 feet east of State Highway 226 and approximately 2.5 miles north of the State Highway 226/County Road 18 intersection, in the NW1/4 SE1/4 of Section 34, Township 40N, Range 52E, Elko County. The access road would be from State Highway 226 and would be approximately 440 feet long.

Three-phase power would be obtained from overhead lines 32 feet west of the site, on the east side of State Highway 226. Telephone lines would be connected to an underground cable 405 feet west of the site, on the east side of State Highway 226.

Appendix B, Figure B.4 of this EA, provides a map showing the surrounding topography.

## 2.6 Alternative 5: Packer Site (CGS-5)

The Packer site is 38 feet west of State Highway 226 and approximately 1 mile north of the State Highway 226/County Road 18 intersection, in the SE1/4 NW1/4 of Section 10, Township 39N, Range 52E, Elko County. The access road would be from State Highway 226 and would be 38 feet long.

Three-phase power would be obtained from overhead lines 508 feet east of the site across State Highway 226. Telephone lines would be connected to an underground cable 98 feet east of the site, across State Highway 226.

Appendix B, Figure B.5 of this EA, provides a map showing the surrounding topography.

## 2.7 Alternative 6: BLM 3 Site (CGS-6)

The BLM 3 site is 30 feet west of County Road 18, 1.9 miles southwest of the turn from County Road 18 to Tuscarora, in the NE1/4 SE1/4 and the SE1/4 NE1/4 of Section 15, Township 39N, Range 51E, Elko County. The access road would be from County Road 18 and would be 30 feet long.

Three-phase power would be obtained from overhead lines 520 feet east of the site across County Road 18. Telephone lines would be connected to an underground cable 2 feet from the site along the west side of County Road 18.

Appendix B, Figure B.6 of this EA, provides a map showing the surrounding topography.

## 2.8 No Action Alternative

The no action alternative is deletion of the northeastern Nevada relay node from the GWEN network. Adoption of this alternative would mean a consequent degradation in the performance of the system, due to a lack of connectivity to other nodes in the system.

# 3.0 AFFECTED ENVIRONMENT

This section discusses the environmental setting of the proposed GWEN project in northeastern Nevada. Section 3.1 of this EA describes the general characteristics of the SSA, and Sections 3.2 through 3.7 of this EA describe the unique characteristics of each CGS within the SSA. Site descriptive data was obtained during field investigations conducted in February 1990. U.S. Geological Survey 7.5 minute topographical maps were used as data sources for distances, physiographic features, and topography (USGS, 1970a-c, 1987a-h).

## 3.1 Site Search Area

Presented below is information on the physical, biological, and socio-cultural settings of the SSA.

### 3.1.1 Physical Setting

The SSA in northeastern Nevada is a circular, 250-square-mile area in Elko County, centered approximately 1.7 miles north of the town of Tuscarora in the Great Basin section of the Intermountain Plateaus physiographic province of the United States. The Great Basin consists of linear, north-south mountain ranges separated by valleys. The SSA is in Independence Valley, flanked on the east by the Independence Mountains and on the west by the Tuscarora Mountains, with the relatively well-defined channel of the South Fork of the Owyhee River flowing northward up the center of the valley. The Independence Mountains rise about 3,000 feet above the valley floor in the vicinity of the SSA, reaching a height of about 9,100 feet above mean sea level (MSL) near the SSA; the Tuscarora Mountains are slightly lower at 8,400 feet above MSL. The SSA includes portions of both ranges, but all the CGSs are in the gently sloping alluvial plain that extends from the bases of the mountains to the center of the valley.

Central Nevada's physiography, a series of alternating basins and mountain ranges, is the result of block faulting. Bedrock geology in the SSA consists of volcanic and sedimentary rocks of the Tertiary period, primarily andesite tuffs and lava flows, mudstones, siltstones,

and sandstones that overlie carbonaceous and weakly calcareous shales, cherts, and quartzites (BLM, 1989). Sedimentary deposits in the basin floor are eroded materials from the Independence and Tuscarora mountains (Hunt, 1967).

The SSA is between the seismically active western Nevada and Utah-Nevada seismic areas. Thirteen earthquakes have been recorded within a 40-mile radius of the center of the SSA. Ten of these were magnitude 4.0 to 4.9 on the Richter scale; the other three were magnitude 5.0 to 5.9. In 1901, one of these three was centered approximately 35 miles southeast of the center of the SSA. The earthquake had a Richter magnitude of 5.0 and a Modified Mercalli (MM) intensity of VII and damaged buildings in Elko. The other two, with magnitudes of 5.8 and 5.6, occurred in 1916 and were centered 11 miles northwest of the SSA center (Howard *et al.*, 1978; King, 1967; Kinney, 1966; Slemmons *et al.*, 1964; Stover, 1986). The SSA could be subject to strong ground shaking due to a major earthquake in the vicinity; however, ground rupture along a fault line has not been reported near the SSA, and the potential for primary ground rupture is very low. Secondary seismic hazards that could affect the site include ground cracking due to liquefaction, lurching, or slope failure and ground settlement. Current siting and construction standards make the level of seismic risk to the GWEN project very low (Manitakos, 1989).

Gold and silver have been mined in the area of the SSA since the late 1860s. Gold, the primary mineral resource of commercial value, occurs both in gold-bearing fracture zones, or stockworks, and in placers in andesite lavas and tuffs in the southern half of the Tuscarora mining district. Silver occurs in relatively narrow lodes in intrusive andesite bodies north of Tuscarora (BLM, 1989). Mineral claims exist on or within two of the BLM sites (CGS-2 and CGS-6). Mineral rights to the private lands appear to be held by the landowners.

No significant paleontological resources are known to exist in the SSA. If present, such resources would occur mainly in mountain range bedrock. Fossils on the valley floor would be fragments washed down from the surrounding mountain slopes. Because paleontological resources are generally of scientific value only when their origins are known, these fragments are not likely to be significant (Lugaski, 1990).

The soils of the Great Basin are Gray Desert soils, which tend to be very limy just a few inches below the surface. Even the surface is slightly limy, due to the small amount of precipitation available for leaching. Organic layers are thin to nonexistent, whereas salt concentrations are usually high (Hunt, 1967). The soils on the CGSs are in either the Gochea gravelly loam or the Donna-Stampede association, both of which are neutral to moderately alkaline, with pH levels ranging from 6.6 to 8.4. Potential for erosion by wind and water is slight to moderate. Permeability is moderately slow to very slow, and runoff is low. The depth to the seasonally high water table is more than 5 feet (SCS, 1990). None of the soils on the CGSs are designated prime farmland (Campsey and Blackburn, 1990); none of the CGSs have hydric soils (SCS, 1987). The specific soils on each CGS are discussed in Sections 3.2 to 3.7 of this EA.

Groundwater in the Tuscarora area occurs in shallow alluvial zones where water accumulates in the alluvial sediments along the foothills, and in deeper zones where water accumulates in fractures in volcanic tuffs, andesites, or volcanic sandstones and siltstones. Tuscarora obtains its potable water supply from two springs located approximately 1 mile northwest of the townsite. Water quality in the springs depends on the composition of rain and snow in the area, composition of the rocks, and activities around the springs. Water in most of the springs near Tuscarora has a very low total dissolved solids content (20 to 120 milligrams per liter [mg/l]) and low concentrations of sulfate (less than 1.0 to 1.9 mg/l), suggesting a short residence time in the rock. Some springs, however, have higher suspended solids (550 mg/l) and sulfate (190 mg/l) concentrations, indicating an origin in shallow aquifers and less susceptibility to variations in flow in response to climatic variations. Grazing cattle pose the greatest threat to water quality. One of the springs contains a low level of ammonia, which indicates surface contamination by decaying organic substances and fecal waste. Groundwater in the area meets the Environmental Protection Agency (EPA) national primary water quality criteria, but secondary standards are exceeded for some parameters, such as sulfate, total dissolved solids, and chloride (BLM, 1989).

The SSA has very little surface water, although the small streams that are present provide high quality fish habitat. The South Fork of the Owyhee River flows north through the

center of the SSA. The segment of the Owyhee River north of Tuscarora and its tributaries, Snow and Harrington creeks, are designated Class I Streams by the State of Nevada. Class I Streams are perennial, used by large numbers of fish, only lightly influenced by human activity, and have a swift enough flow to influence downstream water quality or meet criteria regarding species of special interest. Four other creeks that flow into the South Fork—McCann, Taylor Canyon, Niagara (shown as Dove on the Nevada Department of Wildlife map and Jerritt Canyon on the county road map) and Burns—are Class II Streams. Class II Streams are perennial or intermittent, used by moderate numbers of fish, and are critical to less-valued species or have lightly modified waters of moderate influence on downstream waters (NDW, 1987).

Springs in the area flow from northwest to southeast along canyons cut through the volcanic rock complex. During the dry season, when stream flow is diminished, most of the springs dry up. The springs that persist through the dry season are at lower elevations, but they, too, dry up if droughts last for several years (BLM, 1989). The center of the valley contains areas of grazed wetlands with lush grass cover, but open surface water other than the perennial streams is rare. Four stock ponds are about 1 mile from the Wright (CGS-4) and Packer (CGS-5) sites, and six others are even farther from the CGSs. The distances from each CGS to the nearest surface water or wetlands are given in Sections 3.2 through 3.7 of this EA.

Federal Emergency Management Agency (FEMA) 100-year floodplain maps have not been completed for the entire SSA. However, maps are available for the areas surrounding the BLM 1 (CGS-2), BLM 2 (CGS-3), and Wright (CGS-4) sites. These three sites are not located in the 100-year floodplain zone (FEMA, 1984). Floodplain maps for the Van Norman (CGS-1), Packer (CGS-5), and BLM 3 (CGS-6) sites have not been completed. However, the Soil Conservation Service (SCS) has indicated that these sites are not prone to flooding (Campsey and Blackburn, 1990).

The climate of the SSA is arid due to its position in the rain shadow of the Sierra Nevada Mountains, which are more than 180 miles west. The principal climatic features are dry pure air, an abundance of sunshine, and large daily ranges in temperature. Annual precipitation varies between 8 and 12 inches, most falling during summer thunderstorms

or as snow on mountain peaks during winter storms. Precipitation normally is light at lower elevations throughout the year but is much greater at higher elevations where snow accumulates to a considerable depth. Seasonal temperatures fluctuate widely. Average temperatures at weather stations near Tuscarora are 24°F in January and 69°F in July. The minimum temperatures in Elko County range from -30°F to -40°F and the maximum temperatures range from 98°F to 112°F. The growing season in Tuscarora is 96 days per year. Winds in Nevada are generally light, except for occasional high winds associated with storms (USDA, 1941).

Air quality in the SSA is good and does not exceed the ambient air quality standards set by the State of Nevada (Gould, 1990). Only developments that disturb 20 acres or more of topsoil or have any single source with a throughput of 50 pounds per hour are required by the State of Nevada to obtain an air quality permit (Nevada Administrative Code 445.704-5). Air quality standards are discussed in Section 3.3.3, pages 3.3-1 to 3.3-7 of the FEIS.

### 3.1.2 Biological Setting

The native vegetation of the SSA consists of sagebrush on the alluvial fans along the edges of the valley and lush grasslands on the flatter, low-lying portions of the valley center. Most of the SSA is covered by sagebrush-dominated vegetation 3 to 5 feet high, composed of a shrub layer of sagebrush, shadscale, rabbitbrush, and bitterbush, and an understory of scattered tufts of wheatgrass, cheatgrass, fescue, needlegrass, bluegrass, and ricegrass (BLM, 1989).

Game species in the SSA include mule deer, sage grouse, chukar, Hungarian partridge, mourning dove, and possibly quail. Nongame species include small mammals such as the jackrabbit, skunk, weasel, ground squirrel, woodrat, kangaroo rat, and mouse, as well as the predators (coyote, bobcat, fox, badger and mountain lion) feeding on these game and nongame species. Nongame birds include passerines, such as the sage thrush, horned lark, sage wren, sparrow, raven, and raptors, such as the northern harrier and an occasional golden eagle (BLM, 1989). Other raptors include the red-tailed hawk, rough-legged hawk, Swainson's hawk, northern goshawk, turkey vulture, American kestrel, and

short-eared owl (Herron *et al.*, 1985). Game fish in the streams of the SSA include whitefish and rainbow, brown, brook, and cutthroat trout (NDW, 1987).

Independence Valley is not considered a flyway but it has some water bird activity due to regional wetlands outside the SSA (Erickson, 1990a). Ducks and geese (Bellrose, 1980) and some water birds, primarily grebes and herons, may be present during the fall and spring migration seasons (Jones, 1990).

The Jarbidge Wilderness Area, 50 miles northeast of the SSA, is the nearest federal wilderness area to the SSA. The Humboldt National Forest is 2.8 miles east of the nearest CGS.

The sage grouse is a protected game bird in Nevada (Erickson, 1990a), and several sage grouse leks, or strutting grounds, occur in the SSA. These are traditional breeding areas where male grouse gather to attract and compete for mates (BLM, 1989). The sage grouse live in sagebrush-grassland habitat year-round. Their primary food source is sagebrush in fall and winter and succulent forbs in spring and summer. The young chicks also feed on insects. Starting in early March, males congregate on leks where they perform a characteristic display to attract females. These leks, used year after year, are almost always in open areas surrounded by sagebrush. After breeding, females nest in areas dominated by sagebrush, usually within 2 to 3 miles of the lek (Braun *et al.*, 1977).

No leks are within a CGS, but all CGSs are within 2 miles of such areas. The Nevada Department of Wildlife expressed concern about the tower sites within 1.75 miles of a lek (Erickson, 1990a). Further consultation with the department in July 1990 determined that they were concerned about the possibility of raptors roosting on the tower and preying on the sage grouse (Erickson, 1990b). However, the potential perches on the tower would not be large enough to accommodate raptors.

The *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (GPO 1989-236-985/00336) states that an area must meet three criteria to be designated as wetland: hydric soils; hydrophytic vegetation; and wetlands hydrology, which includes a shallow water table and standing water for at least 1 week of the growing season (FICWD, 1989).

This manual was used as the basis for wetland determination. None of the CGSs have hydric soils (SCS, 1987; SCS, 1990), the depth to the seasonally high water table is greater than 5 feet (SCS, 1990), and no hydrophytic vegetation was observed during the field investigation. Based on the soils data and field observation, none of the CGSs examined as part of this EA contains wetlands as defined under federal criteria, nor is any site within 300 feet of wetlands.

In compliance with Section 7 of the Endangered Species Act of 1973 as amended (16 United States Code [USC] 1531, *et seq.*, at 1536), a list of threatened and endangered species in the project area was obtained during informal consultation with the U.S. Fish and Wildlife Service (USFWS) (Appendix C, Harlow, 1990, 1992, 1993, pages C-4 to C-7, C-13 to C-17, and C-18 to C-20 of this EA). According to the latest list, no threatened or endangered species occur near the SSA. However, seven species that are candidates for federal listing could occur in the SSA: the pygmy rabbit (*Brachylagus idahoensis*), the spotted bat (*Euderma maculatum*), the northern goshawk (*Accipiter gentilis*), the ferruginous hawk (*Buteo regalis*), the loggerhead shrike (*Lanius ludovicianus*), the spotted frog (*Rana pretiosa*), and the interior redband trout (*Oncorhynchus mykiss gibbsi*).

The pygmy rabbit is essentially a species of the deserts of the Great Basin, although it requires relatively moist soils in which to make its burrows. It is chiefly nocturnal but may be seen throughout the day. At least 600 acres of habitat are needed to sustain a breeding population (Thomas, 1979), although its home range is generally within 30 yards of the burrow (Burt and Grossenheider, 1976; Ransom, 1981). It feeds primarily on sagebrush and breeds from May through August (Thomas, 1979). The sagebrush habitat does exist on the CGSs, but no CGS contains moist soils; no water is present on the sites and the depth to the seasonally high water table is more than 5 feet from the surface.

The spotted bat ranges throughout the Intermountain West in a variety of habitats, including ponderosa pine forests and caves. It is most frequently found in California, Arizona, New Mexico, southern Colorado, and southern Utah; its most common habitat is rough, desert-like terrain with suitable roosting cliffs and with a water source within a few miles. The preferred daytime roosts are horizontal rock crevices or vertical rock surfaces of high cliffs and canyons, generally at elevations of 6,000 to 8,000 feet. Moths are the

preferred prey (Allen, 1979; Barbour and Davis, 1969; Zeveloff and Collett, 1988). None of the CGSs contains the habitat required for this species.

Although the wintering range of the northern goshawk lies within the SSA, its breeding range lies outside SSA boundaries. The northern goshawk has highly variable breeding requirements but exhibits a preference for older, denser stands of conifers that are imbedded in areas of younger conifer growth. Typically it nests near a water source and forages by short, fast searching flights or by perch-and-watch techniques. Foraging activity is highest in woodlands or at the woodland fringes, suggesting this is a species adapted to use of forest edges rather than the open prairies and deserts found on the the CGSs. Prey consists of moderate to large birds and mammals (Johnsgard, 1990). The CGSs lie outside the breeding range of the goshawk and do not contain the preferred foraging habitat of forests or forest edges. The CGSs are at least a mile from the nearest forest.

The ferruginous hawk is a species of semi-arid lands, primarily semi-arid grasslands. The hawk specializes in hunting rodents and rabbits, only occasionally taking birds or reptiles. Nesting in Nevada, where it is a common breeding species, is primarily restricted to east-central Nevada in White Pine and Elko Counties, although isolated pairs occur throughout the state. Their preferred nesting sites are junipers at the interface of pinyon-juniper and desert shrub communities. Their hunting patterns vary but emphasize short or low flights. Their usual hunting pattern involves low flights over open ground in which the bird flaps its wings several times and then glides, although they occasionally hunt by hovering, and on rare occasions by soaring (Herron *et al.*, 1985). They also forage from perches or from flight altitudes up to 100 meters above the ground (Johnsgard, 1990). Breeding habitat is absent from the CGSs, each of which is on sagebrush-dominated alluvial fans at least a mile from the juniper-dominated slopes of the bordering mountains. However, the hawk could forage on the CGSs.

The loggerhead shrike is found throughout the United States in a variety of habitats, primarily open country with sparse vegetation of low shrubs and herbs. It prefers areas with nearby perching sites such as fences, woody vegetation, or hedgerows. It forages for insects, small mammals, and small birds using short, straight flights from these perches (Ehrlich *et al.*, 1988; Ransom, 1981). Shrikes nest near water, and breeding pairs occupy

areas of 13 to 40 acres although solitary birds probably defend somewhat smaller territiories (Jaeger, 1961). It forages in northern California and adjacent areas from March through October and overwinters in the southern United States and areas further south. It breeds in April, May, and June (Thomas, 1979). Although breeding habitat is absent from the CGSs, foraging habitat is present on all the CGSs.

The spotted frog occurs in a number of upland and wetland habitats throughout the northwestern states. Marshes and ponds are its primary breeding sites; permanent streams are a secondary breeding site. It may forage in areas adjacent to the wetlands. These wetland habitats are absent from all of the CGSs. In the northern part of its range, it hibernates during the winter, forages from February through October, and breeds from April through September (Thomas, 1979).

The interior redband trout's optimum habitat is clear, cold water running over silt-free substrate. Both McCann Creek and Taylor Canyon Creek, which feed into the South Fork of the Owyhee River, are considered habitat for the redband trout (Hamlin, 1992). The closest the sites come to either of these streams is 400 feet. All the sites are dry with no standing water or streams.

The Nevada Natural Heritage Program was unaware of any endangered, threatened, candidate, or sensitive plant or animal species within the SSA. However, two rock cresses (*Arabis falcifructa* and *Arabis falcatoria)* and a phlox *(Collomia renacta)* were identified as plant species of some concern that might occur in the SSA, although they have no official status (Kolar, 1990). The rock cresses grow in rock crevices on slopes of high ridges in mountain ranges. The phlox generally grows in juniper woodlands with sagebrush understory near outcrops of rock basalt, or on riverbanks. These habitats do not occur on any of the CGSs, which are on the fine-textured alluvial fans at the base of the mountains (Withers, 1990; Knight, 1990).

### 3.1.3 Socio-Cultural Setting

Native Americans have occupied the Great Basin area intermittently since around 10,000 B.C. The adaptive strategies these groups used changed through time and are marked by the adoption of varying subsistence strategies and technologies in response to various environmental and cultural factors. The Western Shoshones occupied the area in historic times, and a winter village at Owyhee, in Independence Valley north of the SSA, is believed to have belonged to this group. Membership in Shoshone groups fluctuated considerably, and these groups were more loosely organized families than they were tribes. The groups occupied small, local geographic areas, frequently centering around a single valley or cluster of winter villages and basing their hunting and gathering activities on the seasonal fluctuation of plant and animal resources (Busby and Harmon, 1990).

Euro-American presence in the area began in 1829 with Peter Ogden's explorations along the Humboldt River, which is approximately 30 miles south of the SSA. His visits and the subsequent exploration of California helped to develop the Humboldt Trail, which ran along the river. Euro-Americans trickled into the area only slowly during the 15 years following this initial exploration, and most passed through with no intention of settling. After the discovery of gold at Sutter's Mill in California and the ceding of the Mexican Territory to the United States in 1848, emigrants poured over the Humboldt Trail. During 1849 an estimated 50,000 people made the crossing with their livestock—a great migration that adversely affected the Great Basin ecosystem. The emigrants and their animals depleted the available forage, polluted the water, and consumed available native food sources, causing great resentment and privation among the Native Americans. Hostile actions by Native Americans were often reported along the trails and valleys in central and western Nevada, and the resulting tensions escalated into the Pyramid Lake War of 1860 (Busby and Harmon, 1990).

By 1850 there were traders along the Humboldt Trail and some people were settling in the valleys. Major discoveries of precious metals in central Nevada in the 1860s led to several decades of boom and bust mining, with towns often built only to be abandoned. The only permanent settlers were often the farmers and ranchers who supplied food to the miners. Gold mining began at Tuscarora in July of 1867, and, by that fall, 300 miners were active in

the area. Chinese laborers, released from the railroad upon completion of the transcontinental line, arrived in 1869. By 1871 silver mining had begun, and a new settlement was laid out northeast of the original site, closer to the silver sources. The new settlement retained the name Tuscarora, and the Chinese took over the old town and continued mining for gold. The transcontinental railroad reached Elko, approximately 35 miles southeast of the SSA, in the early 1870s and became the focal point of mining and agriculture in the region. By the late 1870s and the mid-1880s, Tuscarora was the largest town in Elko County and had four newspapers, two skating rinks, a ballet school, a theater, and two of the largest lumber yards in Nevada. The surrounding hills were virtually stripped bare of sagebrush during this period, because it provided fuel to power the mills. Mine production remained moderate to the turn of the century but dropped off thereafter until the 1980s, when mining exploration and development was revived. The Tuscarora gold mine represents this twentieth-century revival, although it is not currently operating. Ranching, important to the economy since its introduction in 1872, is widely dispersed and relies upon large acreage for cattle grazing (Busby and Harmon, 1990).

The Nevada State Historic Preservation Officer (SHPO) was consulted, as required by the National Historic Preservation Act (16 USC 470, *et seq.*). The Nevada SHPO recommended that a cultural resources survey of the CGSs be conducted (Appendix C, Baldrica, 1990, page C-11 of this EA). In July 1990, a cultural resources survey was conducted, consisting of an on-site archaeological survey and an archival data search for archaeological sites and historic properties within 1.5 miles of the CGSs that are listed, eligible, or potentially eligible for listing on the National Register of Historic Places (NRHP) (Busby and Harmon, 1990). The work was conducted according to BLM Class III criteria (BLM, 1990) to comply with both BLM and Nevada SHPO standards because three of the six sites are on BLM land and use of a BLM site would require a right-of-way release and the adoption of this environmental assessment.

The archival data search revealed three potentially eligible archaeological sites within 1.5 miles of one CGS (Van Norman, CGS-1), but no sites were located on a CGS. The three archaeological sites were a Chinese cemetery, 1.2 miles northwest, and two sites containing archaeological remains of mills, 0.7 and 1.1 miles northwest. These sites are significant only for their potential contribution to archaeological and historic research.

They would therefore not be affected by potential visual impacts from a GWEN tower. Because these sites are outside the area of ground disturbance, they would not be subject to physical impacts.

The on-site archaeological portion of the inventory was conducted by an archaeologist qualified within the State of Nevada using pedestrian transects at 30-meter (100-foot) intervals. No archaeological resources were present on any of the sites (Busby and Harmon, 1990).

For reasons discussed in Section 4.8.1.3, beginning on page 4.8-2 of the FEIS and Section 4.1.3 of this EA, historic properties within 1.5 miles of a CGS are potentially subject to adverse visual impacts from the relay node facility. The archival data search indicated that no historic properties listed or potentially eligible for listing on the NRHP are present on or within 1.5 miles of any of the sites. However, discussions with the BLM revealed that previous studies identified the townsite of Tuscarora, approximately 1.3 miles northwest of the Van Norman site (CGS-1), as eligible for listing on the NRHP as an historic district (Busby and Harmon, 1990). However, the boundaries of the historic district were not determined in the study. (See Figure 2.1, page 2-2 of this EA for general location of the townsite in relation to the CGSs.) Portions of the town are considered eligible because of their significance within the context of state history. The setting has already been compromised by modern structures and mining activity (Jaynes, 1990), so setting is not important to the townsite's eligibility. The townsite's eligibility would therefore not be affected by potential visual impacts from a GWEN tower.

In compliance with the American Indian Religious Freedom Act of 1978 (42 USC 1996), the Bureau of Indian Affairs (BIA), the Nevada SHPO, and the Nevada State Indian Commission were consulted in order to locate tribes associated with the project area (Allan, 1992; Baldrica, 1992; Sutherland, 1992a, 1992b). Based on the recommendations of these organizations, seven tribal organizations were notified of the GWEN project and information was requested regarding traditional, religious, or sacred sites within the SSA: the Duck Valley Reservation of Shoshone-Paiute, the Inter-Tribal Council of Nevada, the Elko Band of TE-Moak Tribes of Western Shoshone, and four bands of the TE-Moak (South Fork, Wells, Battle Mountain, and Elko). Personal communication with the tribal

administrator of the Elko Band of the TE-Moak Tribes of Western Shoshone established that the tribe had no concerns about impacts of the GWEN project on Native American sites (Gonzales, 1991, 1993). No response has been received to letters or to several attempts at telephone communication from the other tribes.

Land use in the area is predominantly cattle grazing, although a relatively small but very conspicuous area centered on Tuscarora is devoted to mining. Tuscarora is the only town in the SSA. Outside of the town, the density of residential structures is roughly one farmstead per township.

State Highway 226 is the only paved road in the SSA, and the other roads are either gravel or dirt. County Road 18, a gravel road, provides the major access to Tuscarora. Three sites are located on private land (CGS-1, CGS-4, and CGS-5) and are zoned Open Space-Agricultural by Elko County. Three CGSs are located on BLM land (CGS-2, CGS-3, and CGS-6) and are not zoned (Boucher, 1991). The BLM would issue a right-of-way, which could contain caveats regarding mining claims, permitting use of the land. Individual arrangements would be made with the mining claimants and the holders of grazing rights (Reiger *et al.*, 1990).

Sources of ambient noise are limited primarily to local vehicular traffic. As described in Section 3.5.3, beginning on page 3.5-1 of the FEIS, local ordinances typically set maximum noise level limits at 70 to 75 dBA for land under agricultural use. Elko County has no local noise ordinance (Moore, 1990).

The estimated 1989 population in Elko County was 25,000, of which 15,500 lived in Elko. The permanent population of Tuscarora is 20, but as many as 9 summer residents may be present (BLM, 1989). Mining, trade, agriculture, and service industries and government account for more than 80 percent of the county's employment, with the gambling industry accounting for much of the service employment (BLM, 1989). Per capita income for Elko County in 1985 was estimated at $9,271, below the state figure of $11,200 (Census Bureau, 1988).

The primary recreational activities are trout fishing and the hunting of deer and game birds. Camping and other outdoor activities near the SSA are generally limited by the lack of water (BLM, 1989). Wilson Reservoir is a BLM-designated Special Recreation Management Area, 25 miles north of the SSA. Its uses include fishing, boating, camping, and sightseeing (Troiman, 1991). The Wildhorse State Recreation Area, with camping, trout fishing, swimming, boating, and water skiing, is about 60 miles northeast of the SSA. The old part of Tuscaraora offers some potential for sightseeing, and studios and a showroom are associated with a pottery school at Tuscarora (BLM, 1989).

The visual setting of the SSA is rural, with fairly level topography in the Independence Valley and steep, but softly rounded, mountain topography in the Independence and Tuscarora mountain ranges. Visible patterns of human origin tend to be linear and are evident in the local roads, fences, and overhead utility lines and poles of the valley floor, and the initial mining scars/roadcuts on the Independence Mountains due east of the BLM 1 (CGS-2) and BLM 2 (CGS-3) sites. The treeless, rounded, brownish-green slopes of the mountains dominate the horizon on all sides of the SSA, but the scarcity of jutting peaks and the absence of tall man-made structures makes the complexity of the skyline low, as defined in Section 4.8.1.3, page 4.8-10 of the FEIS. Horizontal layers of color stand out—the grey-green sagebrush and brighter greens of the valley grasses topped by the browns and greens of the mountains, and the sky. The active mine site at Tuscarora and the nearby soil dumps from prior mining activity provide the most conspicuous features in the SSA due to the contrast of beige soil with surrounding colors.

The BLM evaluated BLM-managed areas within the SSA as part of its Visual Resource Management Plan. As indicated in the Management Plan, the BLM considers public lands within 1 mile of most of State Highway 226 to be Visual Resource Management (VRM) Class III (Troiman, 1991). The BLM 1 (CGS-2) and BLM 2 (CGS-3) sites, which would be within a mile of this highway, are therefore considered VRM Class III. The objective of this class is to partially retain the existing character of the landscape; activities under this class may attract attention but should not dominate the view of the casual observer. The BLM 3 site (CGS-6), which would be outside this visually sensitive area, is VRM Class IV. The objective of this class is to allow for major modifications to the landscape; activities under this class may dominate the view and be the major focus of viewer attention (BLM, 1986).

VRM Classes I or II, which are more sensitive, do not exist within the SSA. Private lands in the SSA do not fall under BLM jurisdiction regarding visual resources.

## 3.2 Alternative 1: Van Norman Site (CGS-1)

The Van Norman site is on slightly rolling land with an overall slope of 3 percent. The soils, in the Donna-Stampede association, are neutral to moderately alkaline, with pH values ranging from 6.6 to 8.4. The depth to the seasonally high water table is more than 5 feet, permeability is very slow, and runoff is medium. The water erosion hazard is slight to moderate and the wind erosion hazard is slight (SCS, 1990).

The site is fenced rangeland; vegetation consists of sagebrush, tussock-forming grasses, and occasional broad-leaved herbs. Mineral rights appear to be held by the property owner. The nearest surface water is an intermittent drainage, 5 feet wide and 1 foot deep, located 200 feet south of the site that handles rainwater runoff. When examined in July 1990, the stream was dry and the area was covered in sagebrush and rangegrass. No hydrophytic vegetation was present.

A sage grouse strutting ground lies about 1 mile to the east.

The townsite of Tuscarora, eligible for listing on the NRHP as a historic district, is approximately 1.3 miles northwest of the CGS. Three potentially eligible archaeological sites are located within 1.5 miles of the CGS: a cemetery and two mill sites. The Chinese cemetery is 1.2 miles northwest of the CGS; the two sites containing mill remains are 0.7 and 1.1 miles northwest of the CGS (Busby and Harmon, 1990). The cemetery has no aboveground remains; the mill remains include only parts of boilers, foundations, and a roof truss. These sites are significant only for their potential contribution to archaeological and historical research. They would therefore not be affected by potential visual impact from a GWEN tower.

CGS-1 is private land and therefore does not fall under BLM jurisdiction regarding visual resources. The nearest residential community is the town of Tuscarora. An open pit gold mine is in operation at the southwest edge of Tuscarora.

## 3.3 Alternative 2: BLM 1 Site (CGS-2)

The BLM 1 site is on flat land, with an overall slope of 2 percent. The soil, Gochea gravelly loam, is neutral to mildly alkaline, with pH values ranging from 6.6 to 7.8. The depth to the seasonally high water table is more than 5 feet, permeability is moderately slow, and runoff is slow. The hazard of water or wind erosion is slight (SCS, 1990).

This site is open rangeland but was cultivated in the 1950s to control the shrub cover (Van Norman, 1990). Vegetation consists of sagebrush, tussock-forming grasses, and occasional broad-leaved herbs. A mineral claim exists within the site area.

The site is dry, with no standing water or wetlands. The nearest surface water is an intermittent stream 0.4 mile southeast of the site. The South Fork of the Owyhee River is 1.1 miles west of the site.

The nearest sage grouse strutting grounds occur to the northwest, west, and southwest of the site, with the nearest grounds about 1.75 miles away.

This site falls within a BLM VRM Class III area (Troiman, 1991). The nearest residential community is the town of Tuscarora, 6.1 miles southwest of the site.

## 3.4 Alternative 3: BLM 2 Site (CGS-3)

The BLM 2 site is on flat land, with an overall slope of 2 percent. The soil, Gochea gravelly loam, is neutral to mildly alkaline, with pH values ranging from 6.6 to 7.8. The depth to the seasonally high water table is more than 5 feet, permeability is moderately slow, and runoff is slow. The hazard of water or wind erosion is slight (SCS, 1990).

The site is open rangeland, with vegetation consisting of sagebrush, tussock-forming grasses, and occasional broad-leaved herbs. At present, no mineral claims exist within the site area.

The site is dry, with no standing water or wetlands. The nearest surface water is an intermittent stream 0.4 mile southwest of the site. The South Fork of the Owyhee River is 0.9 mile west of the site.

The nearest sage grouse strutting grounds occur to the northwest, west, and southwest of the site, with the nearest ones approximately 1.75 miles away.

This site falls within a BLM VRM Class III area (Troiman, 1991). The nearest residential community is the town of Tuscarora, 5.9 miles southwest.

### 3.5 Alternative 4: Wright Site (CGS-4)

The Wright site is on flat, nearly level, land, with an overall slope of 2 percent. The soil, Gochea gravelly loam, is neutral to moderately alkaline, with pH values ranging from 6.6 to 8.4. The depth to the seasonally high water table is more than 5 feet, permeability is moderately slow, and runoff is slow. The hazard of water or wind erosion is slight (SCS, 1990).

The site is fenced rangeland, with varying densities of sagebrush. A small circular clearing in the middle has intermittent grasses that may be the result of a ground fire. Mineral rights are held by the property owner.

The site is dry, with no standing water. The nearest surface water is an intermittent stream 0.3 mile northeast of the site. The South Fork of the Owyhee River is 1 mile west of the site.

The nearest sage grouse strutting grounds are between 0.25 and 1.75 miles southwest of the site.

CGS-4 is private land and therefore does not fall under BLM jurisdiction regarding visual resources. The nearest residential community is the town of Tuscarora, 5.7 miles west.

## 3.6 Alternative 5: Packer Site (CGS-5)

The Packer site is on land that slopes 2 percent to the west toward the South Fork of the Owyhee River. The soils, in the Donna-Stampede association, are neutral to moderately alkaline, with pH values ranging from 6.6 to 8.4. The depth to the seasonally high water table is more than 5 feet, permeability is very slow, and runoff is medium. The water erosion hazard is slight to moderate and the wind erosion hazard is slight (SCS, 1990).

This site is heavily grazed, fenced rangeland, but, apart from having fewer grasses, the vegetation looks much like the surrounding, less heavily grazed lands. The principal cover is sagebrush. Mineral rights appear to be held by the property owner.

The site is dry, with no standing water. The nearest surface waters are intermittent streams 200 feet from the northeast corner of the site and 400 feet west of the site. The South Fork of the Owyhee River is 1 mile west of the site.

The nearest sage grouse strutting grounds are between 0.25 and 1.75 miles north and northwest of the site.

CGS-5 is private land and therefore does not fall under BLM jurisdiction regarding visual resources. The nearest residential community is the town of Tuscarora, 5.5 miles northwest.

## 3.7 Alternative 6: BLM 3 Site (CGS-6)

The BLM 3 site is on flat land, with an overall slope of 2 percent. The soils, in the Donna-Stampede association, are neutral to moderately alkaline, with pH values ranging from 6.6 to 8.4. The depth to the seasonally high water table is more than 5 feet, permeability is very slow, and runoff is medium. The water erosion hazard is slight to moderate and the wind erosion hazard is slight (SCS, 1990).

The site is open rangeland, and vegetation consists of sagebrush, tussock-forming grasses, and occasional broad-leaved herbs. At least three mineral claims exist within the site area.

The site is dry, with no standing water. The nearest surface water is an intermittent stream 800 feet south of the site.

The nearest sage grouse strutting grounds are between 0.4 and 1 mile southwest of the site.

This site falls within a BLM VRM Class IV area (Troiman, 1991). The nearest residential community is the town of Tuscarora, 2.3 miles north.

# 4.0 ENVIRONMENTAL CONSEQUENCES OF ACTION ALTERNATIVES

This section discusses the potential impacts of the GWEN project on the environmental setting of the six CGSs in northeastern Nevada. Several impacts that would be common to some or all of the action alternatives are discussed in Section 4.1 of this EA. Impacts that are unique to each action alternative are discussed in Sections 4.2 through 4.7 of this EA. As indicated in Sections 4.3 and 4.4 of this EA, the project would have significant visual impacts if built on the BLM 1 (CGS-2) or BLM 2 (CGS-3) site. There would be no significant impacts on the other four sites.

## 4.1 Common Features

Presented below is information on the physical, biological, and socio-cultural impacts common to some or all of the action alternatives.

### 4.1.1 Physical

Impacts from **construction** activities would not be significant. Construction would require localized earth-moving, including excavation and backfilling for placement of foundations and guy-wire anchors. Less than 3,800 square feet would be covered with concrete and gravel for the tower base and the equipment area enclosures. Similar coverage would be required for on-site access roads and parking; incidental activities during construction would disturb a similar amount. In total, about 0.25 acre would be occupied by foundations and the on-site access roads. Construction of the off-site access road and installation of utility lines would have no significant impacts because each site is on relatively level terrain and the access road would require little grading. The amount of land disturbed for the access road and its right-of-way would range from 480 square feet to 10,560 square feet (0.24 acre), depending on the site selected.

The ground plane would be installed using machines that bury wire approximately 1 foot below the surface with minimal disturbance of the soil surface. This process would require moving a small tractor or similar equipment over much of the 11-acre site, but would not significantly disturb the existing vegetation or create a significant erosion hazard.

Impacts on **mineral resources** would be minor, as indicated in Section 4.1.1.4, page 4.1-2 of the FEIS. Gold and silver are the primary minerals being mined in the area (BLM, 1989). Mineral claims exist within or near two of the BLM sites (CGS-2 and CGS-6), and mineral rights to the privately owned CGSs appear to be held by the landowners. However, if any mineral resources are present under a site, development of the site would only deny access to a small portion of those resources for the lifetime of the project and would not result in any significant impacts.

Impacts on **paleontological resources** are not anticipated because no significant paleontological resources are known to occur on any CGS (Lugaski, 1990). However, if any fossils are found during construction, work that might affect them will be suspended while the Nevada State Bureau of Mines and Geology is notified and the significance of the find is evaluated.

**Erosion and increase in storm water runoff** would not be significant. All sites have slopes of less than 3 percent, so any required grading to level the site would be minimal. In addition, standard measures for erosion control would be used during and after site construction. The site's vegetation will be restored to its preexisting natural condition.

None of the CGSs is within a **100-year floodplain** or flood-prone area (Campsey and Blackburn, 1990; FEMA, 1984).

No **prime farmland** would be removed from production by the project because none of the sites contains designated prime farmland (Campsey and Blackburn, 1990).

Impacts to **drinking water** are not expected because corrosion of the ground plane is not anticipated to raise copper concentrations in any aquifer or surface water body by more than 20 micrograms per liter (µg/l), as discussed in Sections 3.2.4.1 and 4.2.1.1, pages 3.2-2 and 4.2-3 of the FEIS. This would represent 2 percent of the 1 mg/l copper concentration permitted by the State of Nevada for raw water sources for potable water supply (Nevada Administrative Code 445.248).

Impacts to **surface water or wetlands** that support aquatic plants and animals are not expected because soils found on the CGSs are neutral to moderately alkaline (pH greater than 6.5) and the seasonally high water table is greater than 5 feet below the surface. Although there is surface water within 300 feet of the Van Norman site (CGS-1), neutral soils and seasonally low water tables render impacts to water quality negligible, as discussed in Section 4.2.1.1, beginning on page 4.2-1 of the FEIS.

Impacts to **air quality** would not be significant. Temporary but insignificant increases in air pollutant emissions would occur during construction, primarily from greater use of heavy machinery than would be required in normal farming operations. During operation of the BUPG at 100 percent load, total yearly emissions from the BUPG would be less than 350 pounds per pollutant or 2.2 pounds per hour, as described in Section 2.1.2 of this EA. These are well below the standards set by the Clean Air Act (42 USC 7401, *et seq.*) which requires permits for facilities emitting any single regulated substance at the rate of 50 tons per year. These are also well below the standards set by the Nevada Air Act (Nevada Administrative Code 445.704-5) which requires permits for any single source with a throughput of 50 pounds per hour. As stated in Section 3.1.1 of this EA, air quality permits are not required in the State of Nevada for projects that disturb less than 20 acres of topsoil or have a maximum throughput of less than 50 pounds per hour.

### 4.1.2 Biological

Impacts on **wildlife and wildlife habitat** would not be significant. Each CGS is rangeland, remote from woodlands, ponds, and lakes; the nearest stream is at least 200 feet away from any CGS. None of the sites contains areas that meet the federal criteria for wetlands (FICWD, 1989; SCS, 1987; SCS, 1990).

No significant impacts on sage grouse are expected. None of the sites is in a sage grouse strutting ground, but all are within 2 miles of such an area. Hens usually locate their nests within 2 to 3 miles of the strutting ground (BLM, 1990). The only concern expressed by the Nevada Department of Wildlife was about the tower sites within 1.75 miles of a lek because of the possibility of raptors roosting on the tower and preying on the sage grouse.

However, since the potential perches on the tower would not be large enough to accommodate raptors, the department concurred that a tower on any of the sites would not significantly impact the sage grouse (Erickson, 1990b). They expressed no concerns about potential impacts on the sage grouse habitat (Erickson, 1990b). The removal of 11 acres of sage grouse habitat is insignificant since vast areas of similar habitat exist around the CGSs. In addition, four sites are close to paved State Highway 226 and the utility lines that parallel the highway, and the grouse would be unlikely to nest in such disturbed areas (BLM, 1990).

**Bird collisions** with the tower may occur but are not expected to be significant. Section 4.4.1.5, page 4.4-5 of the FEIS states that the majority of bird collisions occur in adverse weather conditions when the visibility of man-made structures is obscured and birds may be forced to lower their flight level. Generally, songbirds (passerines) are more likely to collide with a tower or the guy wires than are raptors or waterfowl (Avery *et al.*, 1980). The siting process aims to minimize the probability of collisions by avoiding areas with high concentrations of bird flight activity, such as feeding and nesting habitats, prominent topographical features that could serve as navigational aids, known migration corridors, and raptor roosting areas.

No federally listed **threatened or endangered species** would be affected. This determination was made after informal consultation with the USFWS in compliance with Section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531, *et seq.*, at 1536). The USFWS determined that no threatened or endangered species occur within the project area so none would be affected by construction of the GWEN tower (Appendix C, Harlow, 1992, 1993, pages C-13 to C-17, and C-18 to C-20 of this EA). In addition, no significant impacts are expected on any of the seven candidates for federal listing.

Moist soils are required for the pygmy rabbit and the CGSs are located on uplands with a deep water table (greater than 5 feet) and are at least 200 feet from the nearest intermittent stream. Thus, the distances to the closest potential burrowing sites are at least twice the typical radius of a pygmy rabbit's home range and impacts are not expected.

The spotted bat habitats of high cliffs and canyons, ponderosa pine forests, and caves are absent from the CGSs, which are located on the gently sloping alluvium near the center of the valley. In addition, if any bats were to forage within the vicinity of the tower, their sensitive echolocation system would protect them from collision with the tower.

The forest habitats preferred for breeding and foraging by the northern goshawk are remote from the CGSs, each of which is at least a mile from the nearest forests. The northern goshawk is therefore unlikely to occur at any of the CGSs, even as a transient.

No significant impacts are expected on the ferruginous hawk. Breeding habitat for the hawks is absent from the CGSs, each of which is on sagebrush-dominated alluvial fans at least a mile from the juniper-dominated slopes of the bordering mountains. It is possible that non-breeding individuals may forage in the area on a seasonal basis, and they could collide with a GWEN tower or its associated wires. But given the brevity of the typical foraging flight and the use of perches, the probability is low that a foraging ferruginous hawk would be involved in prolonged pursuit of prey that might prevent detection of the tower and its wires in time to take evasive action. Thus, the tower is not expected to significantly impact either nesting or foraging activities.

No significant impacts are expected on the loggerhead shrike. Shrikes nest near water and the CGSs contain no standing water or streams. The banks of the South Fork of the Owyhee River would provide potential nesting sites, but the CGSs are about a mile from this river. The shrike could forage near any of the CGSs, which are all covered with sagebrush and used as rangeland. However, given the foraging behavior of the shrike, which consists of short, straight flights from nearby perches, the probability of a shrike colliding with a guy wire is very low, so the tower would not pose a significant hazard to the foraging shrike.

No significant impacts are expected on the spotted frog. Marshes, ponds, and permanent streams, the breeding habitats for the spotted frog, are absent from all of the CGSs and their immediate vicinity.

No significant impacts are expected on the interior redband trout because the CGSs contain no streams. The sites are at least 400 feet from known habitats of the redband trout, McCann and Taylor Canyon creeks.

The two rock cresses and the phlox mentioned in Section 3.1.2 of this EA are species of some concern to the state although they have no official status (Kolar, 1990). They are found on rocky slopes, woodlands, and riverbanks, and not on the fine-textured alluvium of the valley floor where the CGSs are located (Knight, 1990; Withers, 1990). The GWEN tower would therefore cause no significant impact to these species.

### 4.1.3 Socio-Cultural

**Local employment** would be increased slightly, primarily through use of local subcontractors for earth-moving and possibly for some of the facility's maintenance.

Impacts on **community support systems** would not be significant because the relay node will be unmanned and will use modest amounts of power comparable to that used by an average single-family house. Security needs will be met through agreements with local police officials to monitor the integrity of the site during routine patrols as detailed in Section 4.6.1.1, page 4.6-1 of the FEIS.

Impacts on **land use** would not be significant. The Van Norman (CGS-1), Wright (CGS-4), and Packer (CGS-5) sites are on private lands that are zoned Open Space-Agricultural by Elko County. The three BLM sites (CGS-2, CGS-3, and CGS-6) are not zoned (Boucher, 1991). If the relay node is constructed on one of the BLM sites, the BLM would issue a right-of-way (permit to use the land), although individual arrangements would be required with any mining claimants and holders of grazing rights (Reiger *et al.*, 1990). Care was taken in the site selection process to maintain setbacks from institutional uses such as schools, churches, recreational areas, and areas zoned residential. The tower would not significantly affect property values because non-noxious, nonresidential land uses, such as the proposed relay node, have no systematic effect on housing values, as stated in Section 4.7.1.3, page 4.7-8 of the FEIS.

Construction **noise** impacts would be temporary and insignificant. Operational noise from the back-up generator would be less than 72 dBA at the site boundary. At 50 feet beyond the site boundary the noise level would drop below 65 dBA, as discussed in Section 2.1.2 of this EA. Although Elko County has no local noise ordinance, this noise level is within the standards typically set for residential and mixed residential/agricultural use (55 to 65 dBA), as stated in Section 3.5.3, page 3.5-2 of the FEIS. In addition, the BUPG would only operate at this noise level for 2 hours per week during testing and during commercial power outages. None of the sites has residences within 50 feet of the site boundary.

Impacts on **public health and safety** would not be significant, as discussed in Sections 4.11 and 4.12, beginning on pages 4.11-1 and 4.12-1, respectively, of the FEIS. Shock and burn risks would be associated with the buildup of electrical charges on ungrounded metallic objects inside the inner exclusionary (8-foot) fence located approximately 20 feet from the tower base. However, a grounded person within the outer exclusionary (4-foot) fence located approximately 330 feet from the tower base who touches an ungrounded object while the tower was transmitting would experience only a mild shock, sufficient to cause the individual to break contact but not cause harm. Furthermore, because the transmission periods would total between 6 and 8 seconds per hour during normal operations, the risk of even these mild shocks would be insignificant. Only a determined effort to enter the inner exclusionary zones, within the 8-foot fence, would put a person at increased risk of higher shock and a higher specific absorption rate, dependent on the period of prolonged grasping contact with an ungrounded metallic object. Fire hazards at the relay node facility would be low, as described in Section 4.12.1.1, page 4.12-1 of the FEIS. Radio-frequency emissions would not cause adverse health effects, as described in Section 4.4.1.6, pages 4.4-6 and 4.4-7 of the FEIS. Subsequent to the publication of the FEIS, further study confirmed the conclusion of the FEIS that there is no evidence of adverse effects of GWEN radio-frequency emissions on public health (NRC, 1992).

The relay node would operate in the LF band and therefore would not interfere with pacemakers, emergency communications, commercial and amateur radios, televisions, or garage door openers, as noted in Section 2.1.1.1, page 2-3 of the FEIS.

Impacts on **archaeological resources** would not be significant. An on-site archaeological survey identified no archaeological resources on any of the sites. The three archaeological sites within 1.5 miles of the Van Norman (CGS-1) site that are potentially eligible for the NRHP are significant only for their potential contribution to archaeological and historical research (Busby and Harmon, 1990), so they would not be affected by potential visual impacts from a GWEN tower. The Nevada SHPO concurs with this determination (Appendix C, Baldrica, 1990, page C-12 of this EA). If any archaeological resources are found on the site during construction, work that might affect them will be suspended while the Nevada SHPO and the Office of the State Archeologist are notified in accordance with the provisions of 16 USC 470, *et seq.*, at 470f.

Impacts on **historic properties** would not be significant. The townsite of Tuscarora is the only historic property eligible for listing on the NRHP within 1.5 miles of a CGS (Van Norman, CGS-1). However, setting is not important to its eligibility, so its eligibility would not be affected by potential visual impacts from a GWEN tower. The Nevada SHPO concurred that historic properties would not be adversely affected by a GWEN tower and that no further consultation was necessary (Appendix C, Baldrica, 1990, page C-12 of this EA).

Significant impacts to **Native American traditional, religious, or sacred sites** are not anticipated. Based on recommendations of the BIA, the Nevada SHPO, and the Nevada State Indian Commission, seven tribal organizations were notified of the GWEN project and information was requested regarding traditional, religious, or sacred sites within the SSA: the Duck Valley Reservation of Shoshone-Paiute, the Inter-Tribal Council of Nevada, the Elko Band of TE-Moak Tribes of Western Shoshone, and four bands of the TE-Moak (South Fork, Wells, Battle Mountain, and Elko). Personal communication with the tribal administrator of the Elko Band of the TE-Moak Tribes of Western Shoshone established that the tribe had no concerns about impacts of the GWEN project on Native American sites (Gonzales, 1991, 1993). No response has been received to letters or to several attempts at telephone communication from the other tribes.

**Visual** impacts associated with a GWEN tower are discussed in Sections 3.8 and 4.8, pages 3.8-1 and 4.8-1, respectively, of the FEIS. The significance of a visual impact would

depend on the visual dominance of the GWEN facility and the sensitivity of the affected views. Visual dominance is the degree to which a GWEN facility would compete with other features of the existing landscape for the attention of the viewer. Section 3.8.4, beginning on page 3.8-3 of the FEIS defines four levels of dominance, called Visual Modification Classes (VMC):

- VMC 1, not noticeable: the tower would be overlooked by all but the most interested viewers
- VMC 2, noticeable, visually subordinate: the tower would be noticeable to most viewers without being pointed out but would not compete with other features for their attention
- VMC 3, distracting, visually codominant: the tower would compete with other features in the landscape for the viewer's attention
- VMC 4, visually dominant, demands attention: the tower would be the focus of attention and tend to dominate the view.

Visual sensitivity is a measure of the public's reaction to a proposed change of the affected view and is a function of the viewer's activity, awareness, goals, and values. Consequently, the more sensitive the view, the stronger will be the public reaction to any alteration of it. Areas defined in the FEIS as having high visual sensitivity include national and state parks; designated scenic routes; designated national, state, or local historic sites where setting is important to their historic significance; and travel routes providing primary access to these sites. Examples of areas having medium visual sensitivity would be locally popular, but undesignated, beaches or public use areas, and the travel routes that provide primary access to them. To be considered high or medium visual sensitivity, travel routes must be within 1.5 miles of the tower and within 3 miles of a scenic or recreation area or within 0.5 mile of an historic property. Low visual sensitivity includes those views from sites, areas, travel routes, and sections of travel routes not identified as

medium or high in sensitivity. In the BLM management system, a rating of VRM Class I or II is approximately equivalent to a high sensitivity area; VRM Class III is approximately equivalent to a medium sensitivity area; and VRM Class IV is approximately equivalent to a low sensitivity area.

According to FEIS criteria, significant visual impacts would occur if the relay node facility were to dominate or codominate (VMC 4 or 3) a high-sensitivity view or dominate (VMC 4) a medium-sensitivity view. If the relay node facility cannot be seen from medium-to-high sensitivity routes or areas, then visual impacts are not considered significant. Distance is the primary factor in determining visual dominance and therefore visual impacts. At distances greater than 3 miles, a GWEN tower would not be visible to the unaided eye. At 1.5 to 3 miles, the tower would be visually subordinate if noticeable (VMC 2) but more usually would not be noticed (VMC 1) because of its grey color and lack of mass. If a viewer at this distance actively sought the tower, it would appear as a thin vertical line on the horizon. Within 1.5 miles, the tower becomes a more important component of the view. In addition, other aspects of the tower's setting, such as focal point sensitivity, skyline complexity, competing feature interest, and topographic and vegetative screening, become important considerations in determining the level of visual impact.

USGS topographic maps and a windshield survey were used to determine if high or medium sensitivity views were within 1.5 miles of the CGSs. The visual impacts associated with each site are discussed in Sections 4.2 to 4.7 of this EA.

## 4.2 Alternative 1: Van Norman Site (CGS-1)

No significant impacts are expected.

Impacts on **surface water or wetlands** would not be significant. Even though an intermittent stream is located 200 feet south of the site, copper leachate would not be expected because the soils are neutral to moderately alkaline (pH 6.6 to 8.4) and the depth to the seasonally high water table is greater than 5 feet. Under these conditions, the potential for transport of copper away from the immediate area of the ground plane and into surface water would be negligible, as noted in Section 4.2.1.1, page 4.2-3 of the

FEIS. The USFWS concurs with this determination (Appendix C, Harlow, 1991, page C-10 of this EA).

Impacts on **archaeological resources** would not be significant. There are no archaeological resources on the CGS; the three archaeological sites potentially eligible for the NRHP that are within 1.5 miles of the CGS are significant only for their potential contributions to archaeological and historical research. They would therefore not be affected by potential visual impacts from a GWEN tower.

Impacts on **historic properties** would not be significant. The townsite of Tuscarora is eligible for listing on the NRHP and is 1.3 miles northeast of the CGS. However, setting is not a determining factor in its eligibility, so its eligibility would not be affected by potential visual impacts from a GWEN tower.

**Visual** impacts would not be significant. The site is considered low sensitivity under FEIS criteria and has no designation under BLM criteria because it is private land.

### 4.3 Alternative 2: BLM 1 Site (CGS-2)

Significant impacts are expected.

**Visual** impacts would be significant. The site falls within a BLM VRM Class III area, which is equivalent to a medium sensitivity view according to FEIS criteria. The tower would be only 800 feet east of State Highway 226 and approximately 400 feet north of an unnamed gravel road. Due to its proximity to the roads and lack of any vegetative screening, the tower would be visually dominant (VMC 4) to travellers along these roads and would create a significant impact.

### 4.4 Alternative 3: BLM 2 Site (CGS-3)

Significant impacts are expected.

**Visual** impacts would be significant. The site falls within a BLM VRM Class III area, which is equivalent to a medium sensitivity view according to FEIS criteria. The tower would be only 200 feet west of State Highway 226 and approximately 400 feet north of an unnamed gravel road. Due to its proximity to the roads and lack of any vegetative screening, the tower would be visually dominant (VMC 4) to travellers along these roads and would create a significant impact.

### 4.5 Alternative 4: Wright Site (CGS-4)

No significant impacts are expected.

**Visual** impacts would not be significant. The site is considered low sensitivity under FEIS criteria and has no designation under BLM criteria because it is private land.

### 4.6 Alternative 5: Packer Site (CGS-5)

No significant impacts are expected.

**Visual** impacts would not be significant. The site is considered low sensitivity under FEIS criteria and has no designation under BLM criteria because it is private land.

### 4.7 Alternative 6: BLM 3 Site (CGS-6)

No significant impacts are expected.

At least three **mineral claims** with a single ownership exist on the site, which will necessitate individual arrangements with the claimant.

**Visual** impacts would not be significant because this site is in a BLM VRM Class IV area, which is equivalent to a low sensitivity area under FEIS criteria.

## 4.8 No Action Alternative

No environmental impact would result from adoption of the no action alternative.

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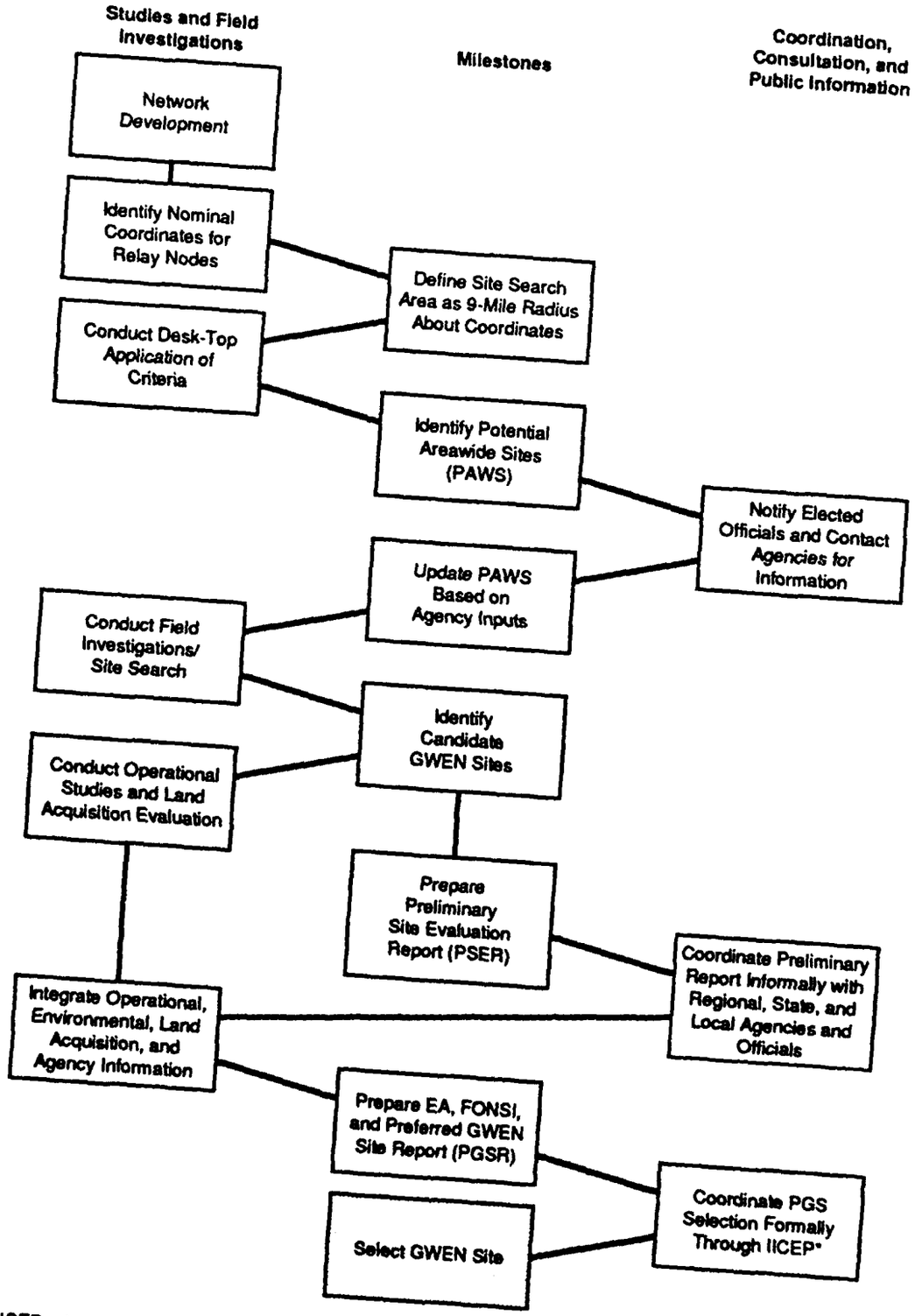
# APPENDIX A

# SITE SELECTION PROCESS

## SITE SELECTION PROCESS

Figure A.1 of this EA shows the sequence of events during the selection of individual GWEN sites. Figure A.2 of this EA describes the screening process used during the field investigation to choose the candidate GWEN sites (CGSs). The environmental siting criteria applied in the site selection process are defined in Tables 5-1 and 5-2, pages 5-7 through 5-14 of the FEIS.




*IICEP = Interagency/Intergovernmental Coordination for Environmental Planning.

FIGURE A.1 GROUND WAVE EMERGENCY NETWORK SITE SELECTION PROCESS

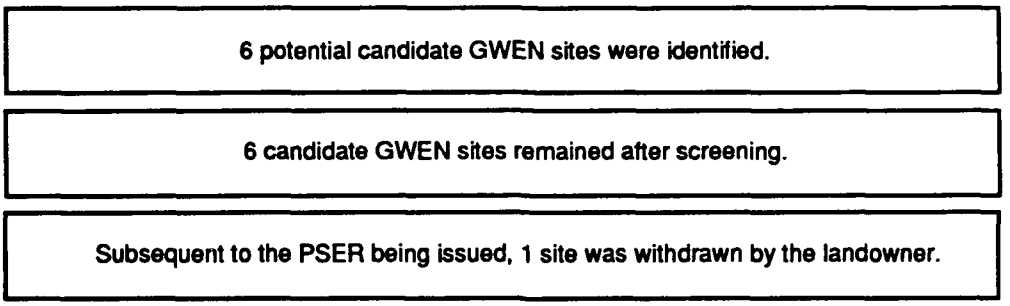



FIGURE A.2 RESULTS OF USING FEIS SITING CRITERIA TO SCREEN POTENTIAL CANDIDATE GWEN SITES IN THE NORTHEASTERN NEVADA SITE SEARCH AREA

# APPENDIX B

# TOPOGRAPHIC SETTINGS OF CANDIDATE GWEN SITES

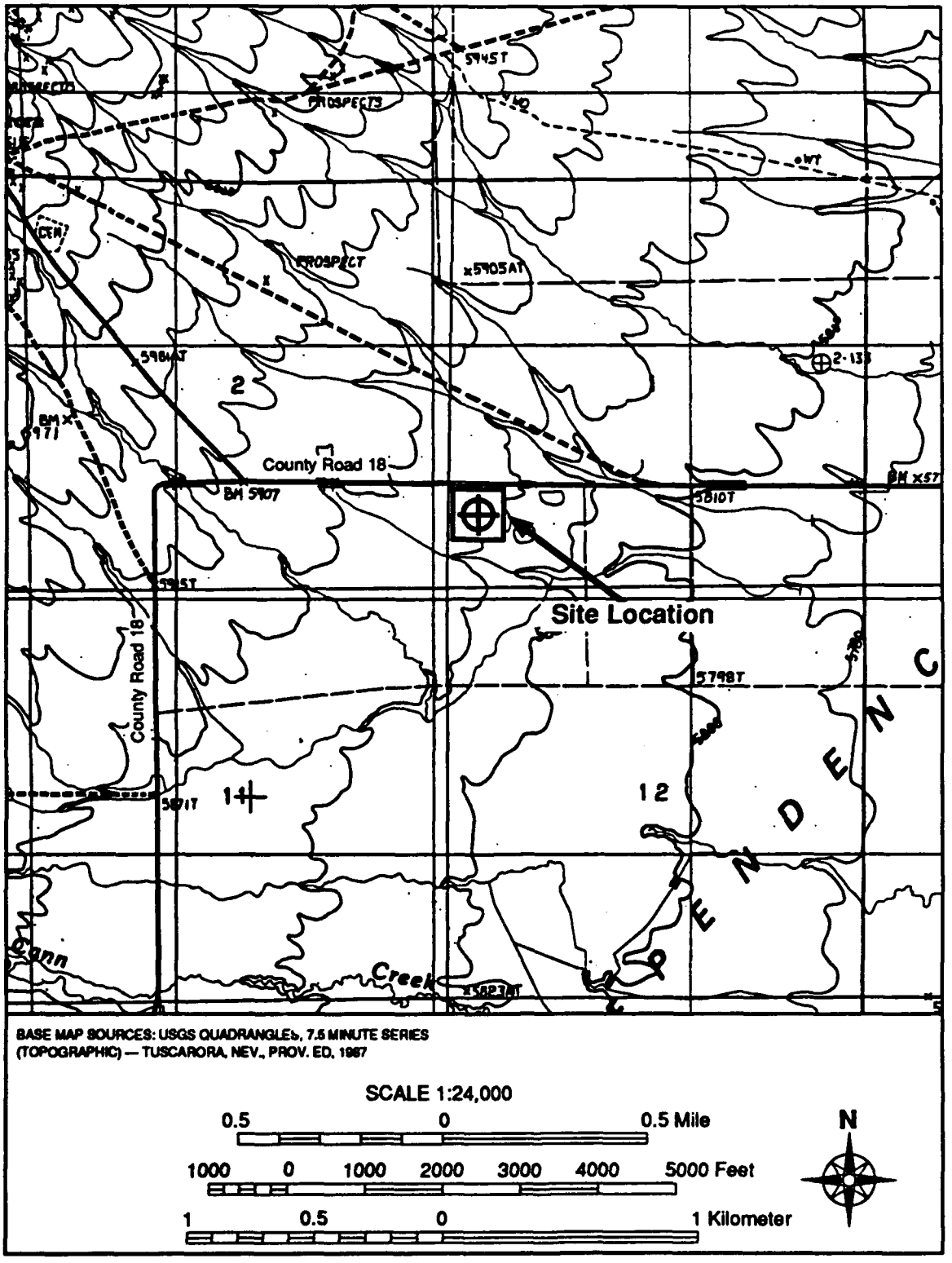



FIGURE B.1 TOPOGRAPHIC SETTING OF THE VAN NORMAN SITE (CGS-1)

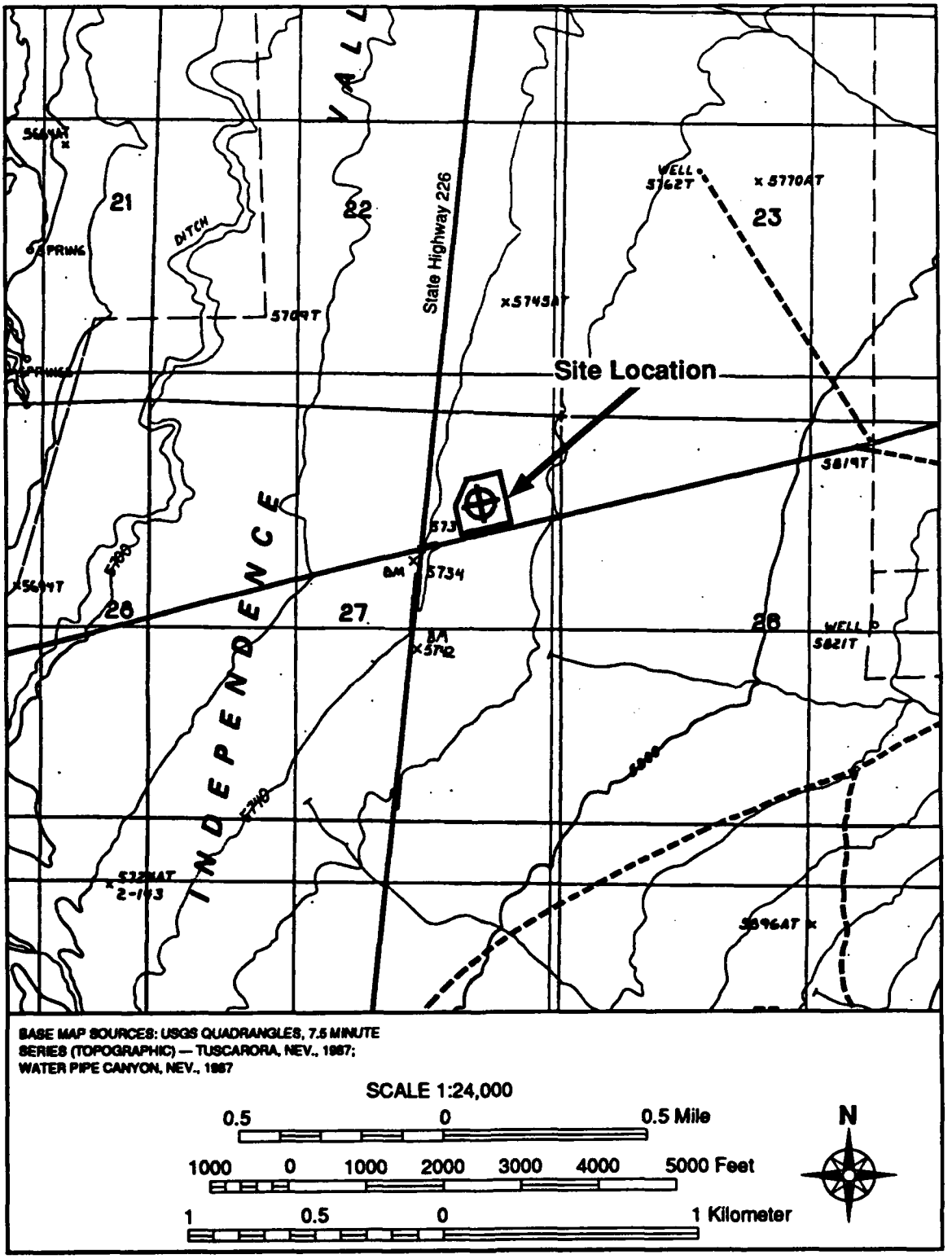



FIGURE B.2 TOPOGRAPHIC SETTING OF THE BLM 1 SITE (CGS-2)

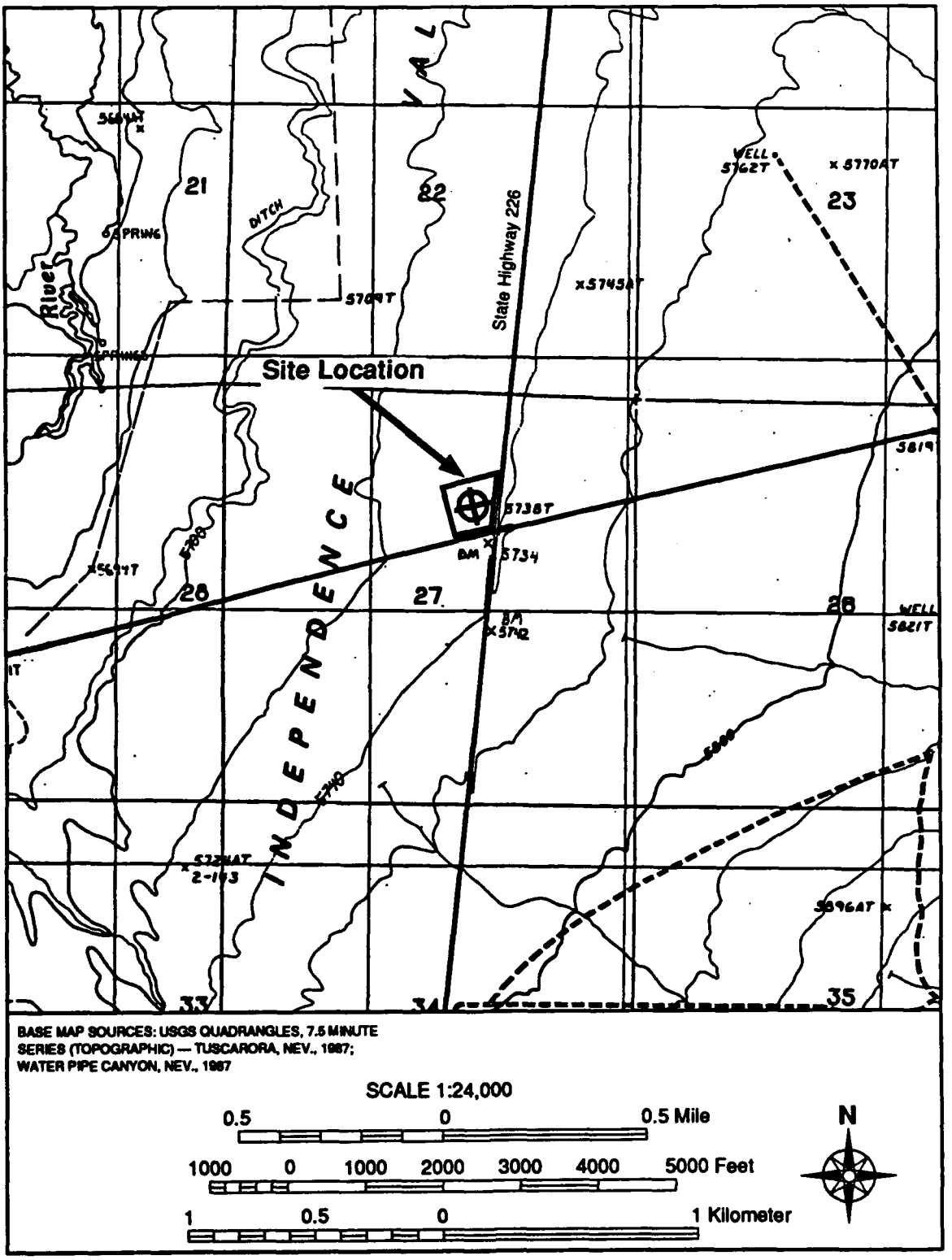



FIGURE B.3 TOPOGRAPHIC SETTING OF THE BLM 2 SITE (CGS-3)

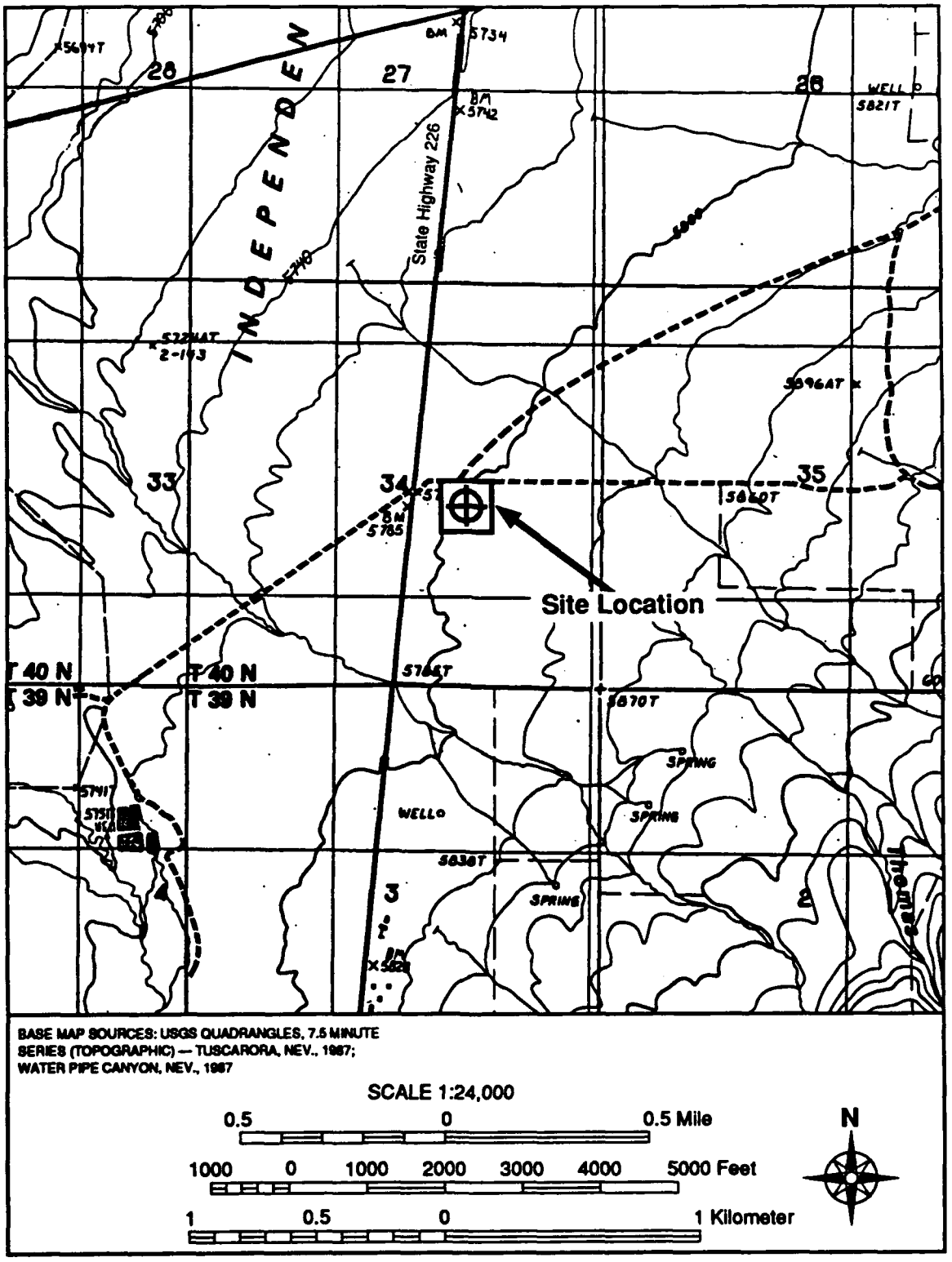



FIGURE B.4 TOPOGRAPHIC SETTING OF THE WRIGHT SITE (CGS-4)

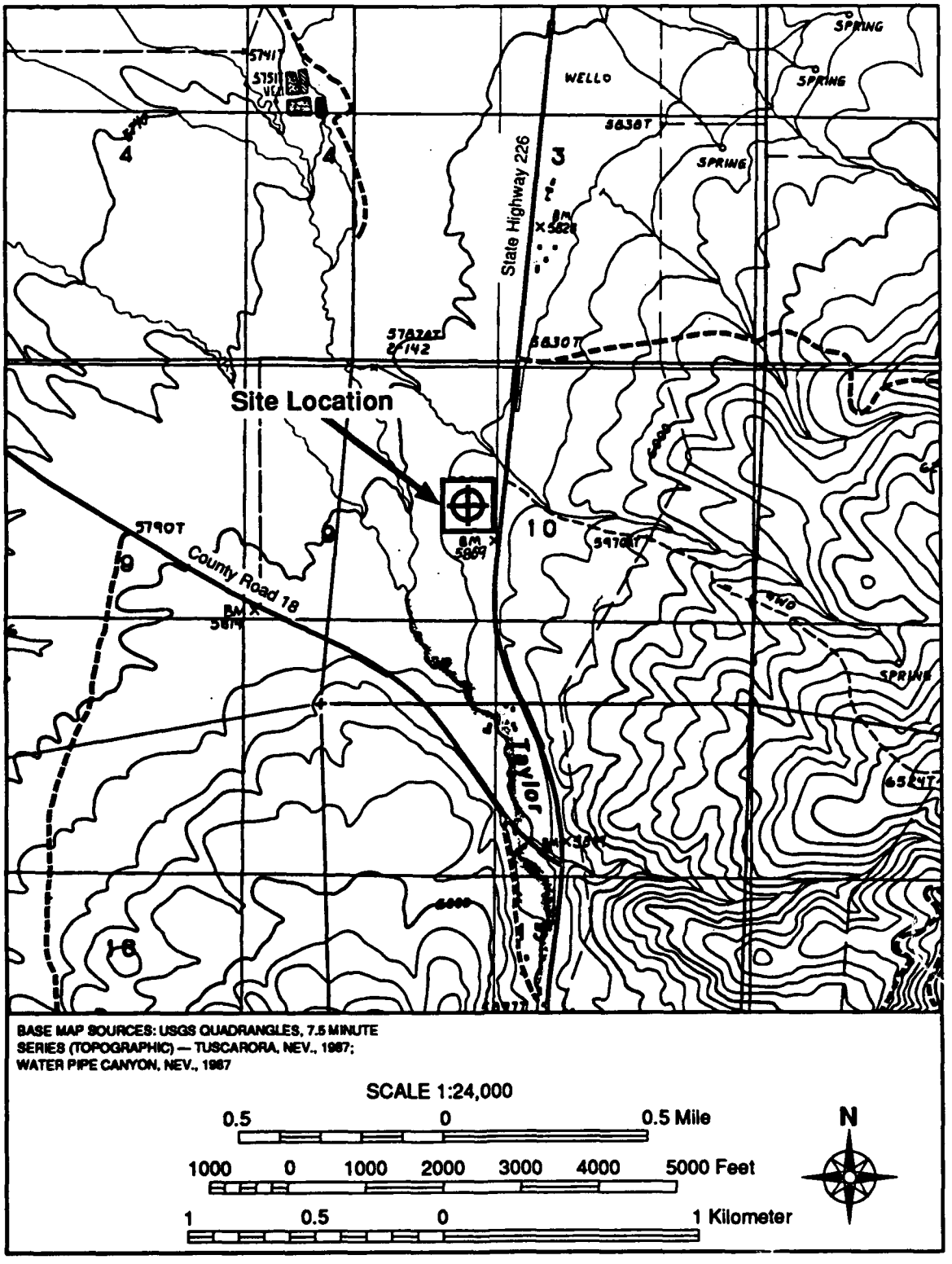



FIGURE B.5 TOPOGRAPHIC SETTING OF THE PACKER SITE (CGS-5)

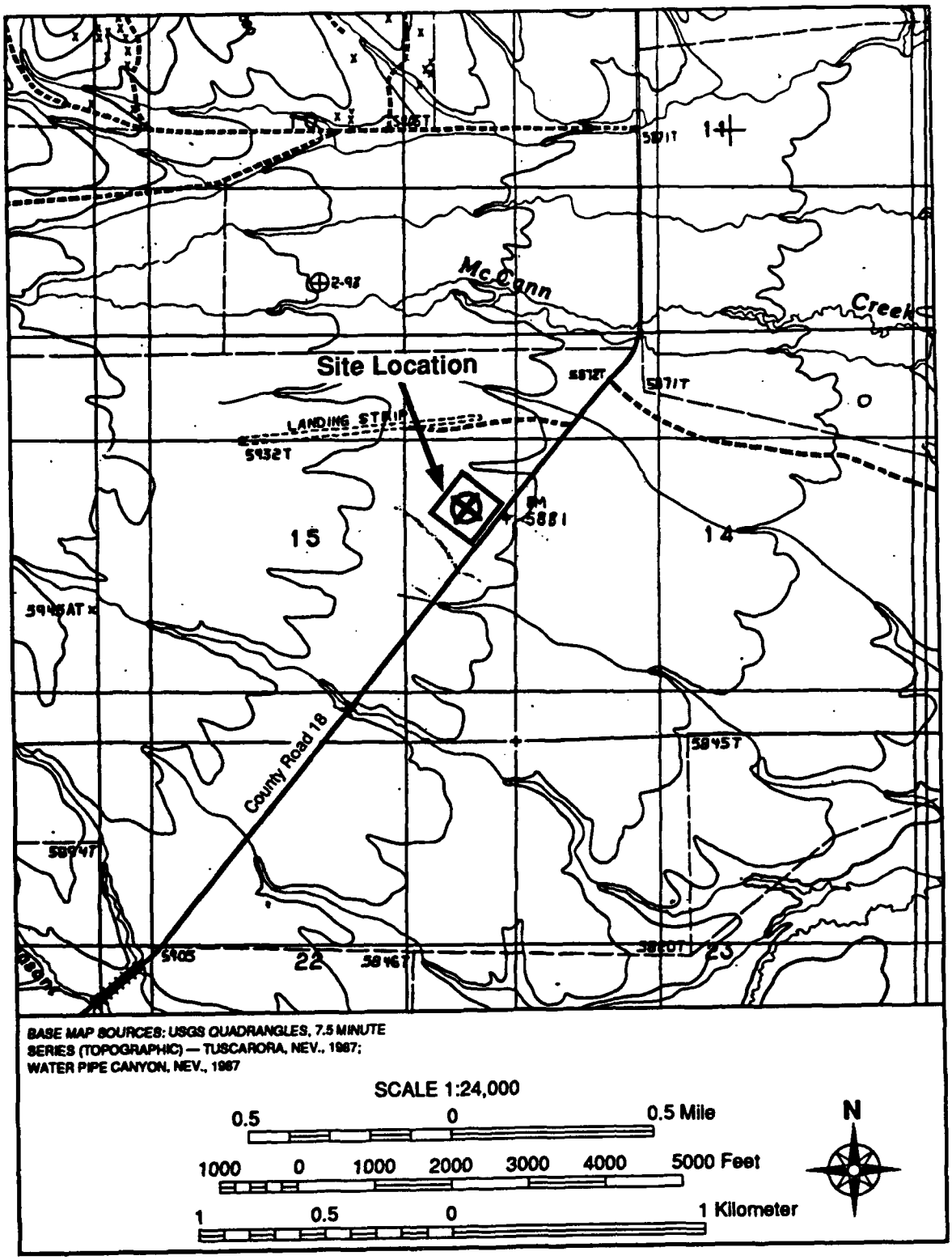



FIGURE B.6 TOPOGRAPHIC SETTING OF THE BLM 3 SITE (CGS-6)

# APPENDIX C

# CORRESPONDENCE

## CORRESPONDENCE

Appendix C documents contacts with the following federal and state agencies and Native American groups:

| Individual | Agency | Date | Response |
|---|---|---|---|
| David L. Harlow, Field Supervisor | U.S. Department of the Interior, Fish and Wildlife Service | 08-01-90 | Attached |
| | | 09-27-90 | Attached |
| | | 02-15-91 | Attached |
| | | 05-27-92 | Attached |
| | | 12-16-92 | Attached |
| | | 01-13-93 | Attached |
| Alice M. Baldrica, Deputy SHPO | (Nevada) Department of Conservation and Natural Resources, Division of Historic Preservation and Archaeology | 06-01-90 | Attached |
| | | 10-29-90 | Attached |
| A. Tom, Chairman | TE-Moak Tribes, Elko, Nevada | Letter was sent on 12-16-92, but no response has been received to the letter or several attempts at phone communication. | |
| D. Gonzales, Tribal Administrator | Elko Band of TE-Moak Tribes of Western Shoshone, Elko, Nevada | Letter was sent on 07-02-90, but no written response has been received. Phone conversation held on 02-19-91. | |

| Individual | Agency | Date Response |
|---|---|---|
| G. Holley, Sr.<br>Chairman | Battle Mountain Band<br>of TE-Moak,<br>Battle Mountain, Nevada | Letter was sent on 12-16-92, but no response has been received to the letter or several attempts at phone communication. |
| G. Healey,<br>Chairman | South Fork Band of TE-Moak,<br>Lee, Nevada | Letter was sent on 12-16-92, but no response has been received to the letter or several attempts at phone communication. |
| A. McQueen,<br>Chairman | Wells Band of TE-Moak,<br>Wells, Nevada | Letter was sent on 12-16-92, but no response has been received to the letter or several attempts at phone communication. |
| H. Adkins,<br>Tribal Administrator | Duck Valley Reservation of<br>Shoshone-Paiute,<br>Owyhee, Nevada | Letter was sent on 07-12-90, but no response has been received to the letter or to several attempts at phone communication. |
| D. Crawford,<br>Executive Director | Inter-Tribal Council of Nevada,<br>Reno, Nevada | Letter was sent on 12-16-92, but no response has been received to the letter or to several attempts at phone communication. |

# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
RENO FIELD STATION
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

August 1, 1990
File No.: 1-5-90-SP-328

Raymond J. Carlisle
SRI International
333 Ravenswood Avenue
Menlo Park, CA 94025

Dear Mr. Carlisle:

The U. S. Fish and Wildlife Service (Service) has reviewed your letter dated July 13, 1990, requesting background resource data, regulatory information, and expressions of concern regarding six candidate sites for a radio communications relay node site near Tuscarora, Nevada, in Elko County. The proposed facility will be part of the Ground Wave Emergency Network (GWEN) communications system. An environmental assessment is to be prepared for a series of candidate sites for the facility. Our primary concerns regarding biological resources that may be affected by the project are provided below.

Endangered and Threatened Species

The possible presence of federally listed endangered or threatened species in the project area should be determined. If endangered or threatened species may be affected, then the Air Force must initiate consultation with the Service under Section 7 of the Endangered Species Act of 1973, as amended (the Act). The Air Force should refrain from conducting project related activities on the site until consultation is completed.

A determination should be made if species that are candidates for Federal listing as endangered will be affected by the project. Although such species receive no protection under the Act, early detection of their presence may avoid conflicts at a later date should they become listed. Should the Assessment reveal that a candidate species will be affected by the project, we urge you to seek technical assistance from our office. We will assist in developing the necessary planning alternatives to avoid conflict should a candidate species become listed before completion of the project.

We are providing you with a list of threatened and candidate species that may be present in the area of or be affected by the project (Attachment A). We are also providing a map showing locations of the threatened Lahontan cutthroat trout (Oncorhynchus clarki henshawi) and the candidate species, redband trout (Oncorhynchus sp.) (Attachment C). This fulfills our requirement to provide a list of species under Section 7(c) of the Act. Please see Attachment B for the Air Force requirements. Attachment D provides references regarding the listed species.

Wildlife Populations and Habitat

Positive and negative impacts, both direct and indirect, to terrestrial and aquatic wildlife and habitats should be identified for each alternative, including access and utility corridors, and all ancillary facilities. Negative impacts to be addressed should include but not be limited to, destruction or alteration of breeding, nesting, cover, and foraging habitat for wildlife. Descriptions of habitat should include both qualitative and quantitative information. Areas with sensitive resources such as rare or threatened species, unique habitat types, sage grouse leks, raptor nesting sites, and wildlife corridors should be identified and avoided to the extent possible.

We are unaware of any critical avian habitats or common avian flyways within the Site Search Area. We are concerned with the potential for impacts to any riparian or wetland habitats within the area, however. Maps accompanying your letter showed the presence of wetlands and 100-year flood plain in the vicinity of site #3. We recommend that site surveys be completed to determine the presence of any wetland and riparian habitats at this and other sites within the Site Search Area. Wetlands should be delineated in accordance with procedures specified in the January 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands. We recommend that any areas containing wetlands or riparian habitats be eliminated as candidate sites. Measures should also be developed to eliminate the potential for silt to move from the project site to nearby wetland areas.

Potential for Bird Collisions with Tower

The Assessment should address the potential for collisions by birds with the tower of the relay node station if this can be a problem with this type of facility. We recommend that measures be developed to reduce the possibility of such collisions occurring.

Cumulative Effects

The Assessment should include an analysis of cumulative impacts on wildlife resources in the area. Impacts from past, present, and reasonably foreseeable future military, mining, grazing, and other actions within the Site Search Area, including private lands, should be considered in this analysis.

We recommend that the Air Force develop measures to avoid, reduce, or compensate for habitat losses and other negative impacts to wildife resources that will result from this project. The assessment should discuss these measures in detail, including revegetation of disturbed areas following project construction.

We are unaware of the presence of any national wildlife refuges, preserves, or sanctuaries or highly sensitive Federal public use areas within the Site Search Area. We note, however, the presence of Humboldt National Forest lands to the east of the Site Search Area. We recommend that you contact the Humboldt National Forest headquarters in Elko, Nevada, regarding potential conflicts.

In addition to consulting with the Air Force under Section 7 of the Endangered Species Act should the threatened Lahontan cutthroat trout be affected by the project, we will comment on any public notice issued for a Corps of Engineers permit pursuant to Section 404 of the Clean Water Act for discharge of dredged or fill material into wetlands or waters of the United States.

We appreciate the opportunity to comment on this project. If you have any questions regarding our comments, please contact Mary Jo Elpers at (702) 784-5227.

Sincerely,

David L. Harlow
Field Supervisor

cc: Assistant Regional Director, Portland, OR (AFWE)
Nevada Department of Wildlife, Elko and Reno, NV
Bureau of Land Management, Reno and Elko, NV
Environmental Protection Agency, San Francisco, CA
Corps of Engineers, Sacramento, CA

Attachment A

Listed species that may be present in or be affected by the GWEN radio communicaitons relay node site near Tuscarora, Nevada.
File # 1-5-90-SP-328

| Common Name | Scientific Name | Status |
|---|---|---|
| **Threatened Species** | | |
| Fish | | |
| Lahontan cutthroat trout | Oncorhynchus clarki henshawi | |
| **Candidate Species** | | |
| Fish | | |
| Redband trout | Oncorhynchus sp. | 2 |

Status:
2 = Category 2 candidate for listing as an endangered or threatened species. Comprises taxa for which the information now in possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are currently not available to support proposed rules.

# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
RENO FIELD STATION
4600 Kietzke Lane, C-125
Reno, Nevada 89502-5093

September 27, 1990
File No.: 1-5-90-TA-381

Mr. Raymond J. Carlisle
SRI International
333 Ravenwood Avenue
Menlo Park, California 94025

Dear Mr. Carlisle:

As requested in your letter dated September 13, 1990, we have reviewed your findings that the proposed Ground Wave Emergency Network (GWEN) relay facility near Tuscarora, Nevada, will not affect the threatened Lahontan cutthroat trout or the candidate species, the redband trout. Our evaluation of the draft Environmental Assessment (Assessment) for the Northeastern Nevada Relay Node, dated September 14, 1990, and Section 4.2, Water Resources, in the GWEN final Environmental Impact Statement (Statement), dated September 1987, enables us to concur with the following findings:

1. The project will not impact either species through erosion and sedimentation, and
2. the probability of corrosion and transport of copper into nearby surface waters is negligible for most sites.

We have some concerns regarding the Van Norman site (CGS-1), Alternative 1. Even though the perennial stream located 200 feet from the site was dry this year, this likely is a result, at least in part, of the extended period of drought presently occurring in Nevada. Therefore, the concern is whether, during a normal water year, copper leachate could be expected to reach surface or groundwaters. The Assessment states that this would not be expected because the soils have a pH of 6.6 to 8.4 and the depth to the seasonally high water table is greater than 5 feet.

Section 3.2 of the Assessment, however, describes the Van Norman site as being on slightly rolling land with medium runoff and a water erosion hazard of slight to moderate. Section 4.2.1.1, Copper Leachate, of the Statement specifies that "Except in acidic soils (those with a pH less that 7), copper tends to precipitate out of solution." This appears to conflict to some degree with the statement on page 4.2-3 of the Statement, "The potential for transport of copper away from the immediate area of the ground plane and into surface water or groundwater would be negligible except in acidic soils (pH less than 6.5) . . . .". Because the pH of the soils on the Van Norman site is 6.6 to 8.4, some copper transport can be expected where the pH is below 7. The perennial stream 200 feet from the Alternative 1 site is a tributary to the South Fork of the Owyhee River. If there is a potential for copper to leach from the soil on the Van Norman site and enter the nearby perennial

stream, waters containing the copper leachate could reach the South Fork of the Owyhee River. Although the Lahontan cutthroat trout and the redband trout are not known to occur in these streams, other aquatic life could be affected by elevated copper levels. The Statement indicates that if a GWEN site were located near (i.e., closer than 300 feet) a surface stream with aquatic life, site specific analyses could be required to predict actual copper concentrations. Because an increase of more than a few micrograms of copper per liter could constitute a significant adverse impact, we suggest that further evaluation of the Van Norman site may be appropriate. We recommend that either further analysis of soil pH, erosion potential, and other factors relative to the specific site location for Alternative 1 be conducted to ensure no negative impacts to stream biota, or that the site be located a minimum of 300 feet from any watercourse according to Environmental Protection Agency recommendations.

We appreciate the opportunity to review this project. If you have any questions regarding our comments, please contact Mary Jo Elpers at (702) 784-5227.

Sincerely,

David L. Harlow
Field Supervisor

cc: Assistant Regional Director, Fish and Wildlife Enhancement, Portland, Oregon (AFWE)
Nevada Department of Wildlife, Reno and Elko, Nevada
Bureau of Land Management, Reno, Nevada
Bureau of Land Management, Elko, Nevada
Environmental Protection Agency, San Francisco, California
Electronic Systems Division, Air Force Systems Command, U.S. Air Force, Hanscom Air Force Base, Massachusetts 01731

# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

U.S. FISH AND WILDLIFE SERVICE
RENO FIELD STATION
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502

February 15, 1991
File No.: 1-5-90-TA-384

Capt. Sandra Shaw
Electronic System Division ESD/DE3
Air Force Systems Command, USAF
Hanscom AFB, Massachusetts 01730

Dear Captain Shaw:

Pursuant to a telephone conversation with Mary Jo Elpers of my staff on February 15, 1991, we are responding to your request for concurrence with your findings regarding the Ground Wave Emergency Network (GWEN) in northeastern Nevada. In a letter to us dated December 12, 1990, you provided an explanation of an apparent contradiction in two sections of the Final Environmental Impact Statement. This apparent contradiction led to confusion regarding the potential for impacts to stream biota from copper leachate resulting from construction of a relay node for the GWEN project.

We concur with your finding that there will be no adverse impact from copper leachate at the Van Norman site. If you have any questions, please contact Mary Jo Elpers at (702) 784-5227.

Sincerely,

David L. Harlow
Field Supervisor

cc: Assistant Regional Director, Fish and Wildlife Enhancement, Portland, Oregon (AFWE)
Nevada Department of Wildlife, Reno and Elko, Nevada
Bureau of Land Management, Reno and Elko, Nevada
Environmental Protection Agency, San Francisco, California

BOB MILLER
*Governor*

STATE OF NEVADA

ROLAND D. WESTERGARD
*State Historic Preservation Officer*

# DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF HISTORIC PRESERVATION AND ARCHEOLOGY
Capitol Complex
Carson City, Nevada 89710
(702) 687-5138

June 1, 1990

Lt. Col. Stephen T. Martin, USAF
Program Manager, GWEN
Department of the Air Force
Headquarters Electronic Systems Division (AFSC)
Handscom Air Force Base, MA 01731-5000

Dear Colonel Martin:

This letter is in response to your correspondence regarding the selection of Ground Wave Emergency Network (GWEN) relay node sites near Tuscarora, Nevada. The sites are located in an area of early historic occupation in the state and ranching, transportation and mining properties should be anticipated.

As per 36 CFR 800.4, the Division recommends an intensive archeological/historic survey of the favored alternatives. A professional archeologist should perform the work and the resulting report should be forwarded to this office for review.

If you have any questions regarding what is needed prior to making a determination of project related effects please call me.

Sincerely,

Alice M. Baldrica

Alice M. Baldrica, Deputy
State Historic Preservation Officer

AMB:emt

BOB MILLER
Governor

STATE OF NEVADA

RONALD M. JAMES
State Historic Preservation Officer

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES**
**DIVISION OF HISTORIC PRESERVATION AND ARCHEOLOGY**
**123 W. Nye Lane, Room 208**
**Capitol Complex**
**Carson City, Nevada 89710**
**(702) 687-5138**

October 29, 1990

Lt. Colonel Stephen T. Martin
Program Manager, GWEN
Dept. of the Air Force
Headquarters Electronic Systems Division (AFSC)
Hanscom Air Force Base, MA 01731-5000

Dear Lt. Colonel Martin:

This letter is in response to your request for comments on the Air Force proposal to construct a GWEN facility near Tuscarora, Elko County, Nevada. We have reviewed the cultural resources report (BLM CRR1-1361n) prepared following intensive archeological/historic surveys of the alternative sites considered for placement. The report documents negative findings from the surveys. In our letter of September 16, 1990, we requested more information on historic properties within the area of potential effect along Taylor Creek. Because the parcel in question has been removed from consideration as a GWEN site, further survey work is not recommended.

The Division concurs that historic properties are not located in the area of potential effect. Further consultation in the Section 106 process is unnecessary for the Tuscarora siting. The U. S. Air Force has satisfied its obligations under the National Historic Preservation Act of 1966.

If you wish to discuss these comments please call me.

Sincerely,

Alice M Baldrica

ALICE M. BALDRICA, Deputy
State Historic Preservation Officer

cc: Stan Jaynes, BLM

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
RENO FIELD OFFICE
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

May 27, 1992

File No.: 1-5-92-SP-211
1-5-92-SP-229
1-5-92-SP-230

Lt. Col. Stephen T. Martin
Program Manager, GWEN
Department of the Air Force
Hanscom Air Force Base, Massachusetts 01731

Dear Lt. Col. Martin:

Subject: Species List for the Proposed Ground Wave Emergency Network (GWEN) Project in Northeastern Nevada

As requested by your letter dated April 23, 1992, we have attached a list of the threatened and endangered species that may be present in the subject project area (Attachment A). To the best of our knowledge, no proposed species occur within the area. This list fulfills the requirement of the Fish and Wildlife Service (Service) to provide a species list pursuant to section 7(c) of the Endangered Species Act of 1973, as amended (Act). Please reference the species list file number shown on Attachment A in all subsequent correspondence. A list of published references dealing with the distribution, life history, and habitat requirements of the listed species is also attached (Attachment C). This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Attachment B for a discussion of the responsibilities Federal agencies have under section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

If you determine that a listed species may be affected by the proposed project, you should initiate consultation pursuant to 50 CFR § 402.14. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office. If, through informal consultation or development of a biological assessment, or both, you determine that the proposed action is not likely to adversely affect the listed species, and the Service concurs in writing, then the consultation process is terminated and formal consultation is not required.

Lt. Col. Stephen T. Martin

Also, for your consideration, we have included a list of the candidate species that may be present in the project area (Attachment A). These species are currently being reviewed by the Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that, by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

Please contact Robin Hamlin at (702) 784-5227 if you have any questions regarding the attached list or your responsibilities under the Act.

Sincerely,

David L. Harlow
Field Supervisor

Attachments

ATTACHMENT A

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED

GWEN Project near Tuscarora, Nevada

File Number: 1-5-92-SP-211

## Listed Species

| | | |
|---|---|---|
| **Fishes** | | |
| T | Lahontan cutthroat trout | *Oncorhynchus clarki henshawi* |

(T)--Threatened

## Candidate Species

| | | |
|---|---|---|
| **Mammals** | | |
| 2 | pygmy rabbit | *Brachylagus idahoensis* |
| 2 | spotted bat | *Euderma maculatum* |
| **Birds** | | |
| 2 | northern goshawk | *Accipiter gentilis* |
| 2 | ferruginous hawk | *Buteo regalis* |
| 2 | loggerhead shrike | *Lanius ludovicianus* |
| **Amphibians** | | |
| 2 | spotted frog | *Rana pretiosa* |

(2)--Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
RENO FIELD OFFICE
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

December 16, 1992
File No. 1-5-92-SP-211 AMD

Lt. Col. Stephen T. Martin
Program Manager, GWEN
Department of the Air Force
Hanscom AFB, Massachusetts 01731

Dear Lt. Col. Martin:

This letter serves to amend our letter dated May 27, 1992, which submitted a list of threatened and candidate species which may be affected by the proposed Ground Wave Emergency Network (GWEN) Project at the Tuscarora Site in Northeastern Nevada. Based on site specific information provided by Louise Forbush, SRI International, list number 1-5-92-SP-211 is amended as follows:

**Fishes**
Threatened
Lahontan cutthroat trout, Oncorhynchus clarki henshawi should be removed from the list

Candidate Category 2
Interior redband trout, Oncorhynchus mykiss gibbsi should be added to the list

The above changes are based on the following specific project locations within the Tuscarora Site area:

1. SW¼SW¼ sec. 1, T. 39 N., R. 51 E.
2. E½NE¼ sec. 27, T. 40 N., R. 52 E.
3. W½NE¼ sec. 27, T. 40 N., R. 52 E.
4. NW¼SE¼ sec. 34, T. 40 N., R. 52 E.
5. SE¼NW¼ sec. 10, T. 39 N., R. 52 E.
6. NE¼SE¼ sec. 10, T. 39 N., R. 51 E.
   SE¼NE¼ sec. 10, T. 39 N., R. 51 E.

Please consider these changes when preparing your environmental documents. If you have any questions, please contact Robin Hamlin at (702) 784-5227.

Sincerely,

David L. Harlow
Field Supervisor

cc:
SRI International AH 303, Menlo Park, California (Attn: Louise Forbush)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
RENO FIELD OFFICE
4600 Kietzke Lane, Building C-125
Reno, Nevada 89502-5093

TAKE PRIDE IN AMERICA

January 13, 1993
File No. 1-5-92-SP-211-AMD
1-5-92-SP-229-AMD
1-5-92-SP-230-AMD

Lt. Col. Stephen T. Martin
Program Manager, GWEN
Department of the Air Force
Hanscom AFB, Massachusetts 01731

Dear Lt. Col. Martin:

Subject: Species List for the Proposed Ground Wave Emergency Network (GWEN) Project in Nevada

This responds to your letter dated December 17, 1992, requesting an updated list of threatened and endangered species that may be present within the subject project area. Enclosed are amended lists for the proposed Tuscarora, Lathrop Wells, and Reese River Valley project sites in Nevada.

Please contact Robin Hamlin at (702) 784-5227 if you have any questions regarding the enclosed list or your responsibilities under the Act.

Sincerely,

David L. Harlow
Field Supervisor

Enclosures

cc:
SRI International, Menlo Park, California (Attn: Louise Forbush)

United States Department
of the Interior
Fish and Wildlife Service
Fish and Wildlife Enhancement
Reno Field Station
Attn: Mr David L. Harlow
4600 Kietzke Lane, Building C-125
Reno, NV 89502-5093

RE: U.S. Air Force Ground Wave Emergency Network (GWEN) Project in Northeastern Nevada

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This is to verify that no changes have been made to the list of federally-designated threatened, endangered, or candidate species sent on May 27, 1992.

David L. Harlow _____ Date _____

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Changes have been made to the list of federally-designated threatened, endangered, or candidate species since our correspondence to you on May 27, 1992. Enclosed is a new list of species.

X David L. Harlow

David L. Harlow Jan 13 1993
Date

ATTACHMENT A

CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED

GWEM Project near Tuscarora, Nevada

File Number: 1-5-92-SP-211 AMD

Candidate Species

| | | |
|---|---|---|
| **Mammals** | | |
| 2 | pygmy rabbit | *Brachylagus idahoensis* |
| 2 | spotted bat | *Euderma maculatum* |
| **Birds** | | |
| 2 | northern goshawk | *Accipiter gentilis* |
| 2 | ferruginous hawk | *Buteo regalis* |
| 2 | loggerhead shrike | *Lanius ludovicianum* |
| **Fishes** | | |
| 2 | Interior redband trout | *Oncorhynchus mykiss gibbsi* |
| **Amphibians** | | |
| 2 | spotted frog | *Rana pretiosa* |

(2)--Category 2: Taxa for which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

# APPENDIX D

# GLOSSARY

# GLOSSARY

## Abbreviations and Units of Measure

| | |
|---|---|
| AM | Amplitude modulation |
| ATU | Antenna tuning unit |
| BIA | Bureau of Indian Affairs |
| BLM | Bureau of Land Management |
| BUPG | Back-up power group |
| CGS | Candidate GWEN site |
| dBA | Decibels on the A-weighted scale, which is a measure of the intensity of the sounds people can hear |
| EA | Environmental Assessment |
| FAA | Federal Aviation Administration |
| FEIS | Final Environmental Impact Statement; in this document, the term refers to the FEIS for the GWEN Final Operational Capability that was released in September 1987 by the U.S. Air Force, Electronic Systems Division, Hanscom Air Force Base, Massachusetts |
| FEMA | Federal Emergency Management Agency |

| | |
|---|---|
| FICWD | Federal Interagency Committee for Wetland Delineation |
| FOC | Final Operational Capability, the third phase of development of GWEN |
| GPO | Government Printing Office |
| GWEN | Ground Wave Emergency Network |
| HEMP | High-altitude electromagnetic pulse |
| IICEP | Interagency and Intergovernmental Coordination for Environmental Planning, the formal review process for the EA |
| kHz | Kilohertz |
| kV | Kilovolt |
| LF | Low frequency |
| mg/l | Milligrams per liter (1 mg/l = 1 ppm) |
| MM | Modified Mercalli, a scale of the severity of earthquake effects |
| MSL | Mean sea level |
| µg/l | Micrograms per liter (1 µg/l = 1 ppb) |
| NDW | Nevada Department of Wildlife |
| NRC | National Research Council, the principle operating agency of the National Academy of Sciences and the National Academy of Engineering |

| | |
|---|---|
| NRHP | National Register of Historic Places |
| PAWS | Potential areawide sites; the portion(s) of an SSA left after application of those siting criteria that do not require a field survey, such as the location of national and state parks |
| PCGS | Potential candidate GWEN site; any site that is identified from roadside surveys as suitable for further investigation |
| PGS | Preferred GWEN site; the CGS identified by the Government that represents the Government's preferred location for a relay tower |
| ppb | Parts per billion |
| ppm | Parts per million |
| PSER | Preliminary Site Evaluation Report |
| ROE | Right-of-entry |
| SCS | Soil Conservation Service |
| SHPO | State Historic Preservation Officer; the person responsible for administering the National Historic Preservation Act at the state level, reviewing National Register of Historic Places nominations, maintaining data on historic properties that have been identified but not yet nominated, and consulting with federal agencies concerning the impacts of proposed projects on known and unknown cultural resources |

| | |
|---|---|
| SSA | Site search area; the 250-square-mile area within which four to six CGSs are identified; the SSA is the area within a 9-mile radius of a set of nominal coordinates in the network design. It is used as a manageable range in which to conduct siting investigations. |
| TLCC | Thin Line Connectivity Capability; the second phase of development of GWEN |
| UHF | Ultrahigh frequency (band); specifically 300 to 3,000 megahertz |
| USAF | United States Air Force |
| USC | United States Code |
| USDA | United States Department of Agriculture |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| VMC | Visual Modification Class |
| VRM Class | Visual Resource Management Class |

**Definitions**

| | |
|---|---|
| Aerie | The nest of a bird on a cliff or mountaintop |
| Air pollutant | An atmospheric contaminant, particularly the 15 atmospheric contaminants specified in federal and most state regulations |

| | |
|---|---|
| Alluvial | Describes material, such as sand, silt, or clay, that was deposited on land by streams; alluvial soils with an alluvium base are susceptible to shifting or liquefaction during earthquakes |
| Archaeological survey | A survey conducted by a trained archaeologist that is designed to test for the presence or absence of archaeological resources; it involves walking an area at predetermined intervals and may involve digging small shovel pits if ground visibility is low |
| BLM Class III Survey | A division of a Phase I archaeological survey. A Phase I survey is often divided into Class I, a literature review and search; Class II, a sample survey; and Class III, a 100 percent survey. |
| Block faulting | Faults that separate the earth's crust into blocks that tend to move independently of one another; the result of block faulting can be seen in a mountain range where the upturned edge of a block of the earth's crust forms the range, the faulted edge forms a steep scarp, and the tilted back of the block forms a long and relatively gentle declivity that merges imperceptibly into a bordering plain |
| Candela | A unit of measure of the intensity of light equal to the brightness of one candle |
| Cultural resource | Prehistoric, Native American, and historic sites, districts, buildings, structures, objects, and any other physical evidence of past human activity |
| Evaluative criteria | Applied to portions of a potential siting area for a GWEN facility to determine its suitability. Areas that rank low against evaluative criteria may be excluded from consideration, or given a low priority in the site selection process |

| | |
|---|---|
| Exclusionary criteria | Criteria used to eliminate or exclude highly sensitive areas or areas that do not meet the limits of acceptable performance from consideration for GWEN facilities |
| Federal jurisdictional wetland | As defined in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (GPO 1989-236-985/00336), a wetland is a class of habitat distinguished by the presence of saturation to the surface or standing water during at least 1 week of the growing season (wetland hydrology), a soil type characteristic of saturated or poorly drained conditions (hydric soils), and the predominance of plants that only or mostly occur on wet sites (hydrophytic vegetation) |
| Ground plane | A part of the antenna system consisting of buried copper wires that extend radially from the base of a GWEN tower for a distance of approximately 330 feet |
| Historic properties | For the purposes of this EA, historic properties are those above-ground structures and resources that are listed or eligible for listing on the National Register of Historic Places |
| Holocene epoch | Geologic designation for the post-glaciation period of time; the last 10,000 years |
| Lek | A site at which grouse gather for displays during the mating season. They are also known as arenas or strutting grounds. Breeding typically occurs nearby |
| Liquefaction | The loss of ground strength by silty and sandy deposits during an earthquake due to seismic vibrations |

| | |
|---|---|
| Modified Mercalli scale | A measure of the intensity of seismic activity based on human perception of the event and potential for damage; the intensity scale is rated on a Roman numeral scale ranging from I to XII. An earthquake of MM intensity I would be detectable only by seismographs; MM intensity V would shake buildings, break dishes and glassware, and cause unstable objects to fall; MM intensity X would destroy most masonry and frame structures, bend railroad rails slightly, and cause tidal waves and landslides; MM intensity XII would cause nearly total destruction of all buildings. Another commonly used seismic intensity scale, based on readings from a seismograph, is the Richter scale, which was developed in 1935. The Modified Mercalli scale is often used when the historic period to be covered includes data prior to 1935 |
| Paleonto-logical | Pertaining to fossils or the study of fossils |
| pH | A measure of acidity in which the lower the number, the more acid the substance; 7 represents neutrality |
| Prime farmland | Land that contains soils having high crop production either naturally or through modification; the U.S. Soil Conservation Service is responsible for designating prime farmland |
| Rain shadow | As air flows down the slopes of a mountain range it is compressed and warmed, allowing minimal precipitation on the valley floor |
| Richter scale | A logarithmic scale for expressing the magnitude of a seismic disturbance in terms of the energy dissipated in it; a 2 indicates the smallest earthquake that can be felt, 4.5 an earthquake causing slight damage, and 8.5 a very devastating earthquake |

| | |
|---|---|
| Sedimentary rock | Rock formed by the consolidation or cementation of particles deposited by water or wind |
| Tertiary period | The geologic period of time from 65 million to 2 million years ago |
| Top-loading element | Portions of the antenna that extend diagonally from the top of the tower, which strengthen the signal and provide additional structural support like guy wires |